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Ragwort Poisoning in Cattle and Cirrhosis of the Liver in Horses.*

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When your Council approached me (J. F. Craig) to arrange for a paper to be presented for discussion at this Quarterly Meeting of the Association, I thought that Ragwort Poisoning in Cattle would form an appropriate subject, in view of the observations Professor Kearney and myself have been able to make during the present year through the assistance of veterinary practitioners. It also seemed to me that it might be appropriate to link this subject up with cirrhosis of the liver in horses, on account of the fact that it is maintained by some that the cause is in reality identical both in horses and cattle, and I have induced Mr. J. F. Timoney, M.R.C.V.S., to contribute to the paper in virtue of his extensive clinical experience of this disease in horses.

A.—Ragwort Poisoning.

Before recounting the observations which have been made in this country regarding poisoning by ragwort, I consider it advisable first to refer to the identification of the plant and after that give an account of the knowledge which has been gained in other countries with regard to the poisonous nature of this plant.

1. *Identification of the Plant.*—The common species of Ragwort in this country is *Senecio jacobœa.*, Linn., dry specimens of which I have here to show you. The description of this plant, as given in Bentham and Hooker's "British Flora," is as follows:—"Root-stock short and thick, without creeping shoots. Stems 2 to 4 feet high, erect, scarcely branched except at the top. Leaves (green) pinnate, with ovate, obovate, or narrow segments, coarsely toothed or pinnatifid, the terminal one large and confluent, the lower ones smaller and distinct, all glabrous or with a loose woolly down, especially on the underside. Flower-heads rather large, of a bright yellow, in handsome compact, terminal corymb. Involucral bracts tipped with black, the outer ones few, and very small. Florets of the ray from 12 to 15, linear oblong and spreading, occasionally but rarely deficient. Achenes of the disk covered with short hairs, those of the ray glabrous."

Ragwort or ragweed is a common plant of pasture in Ireland, in Great Britain and all over Europe as well as

SENECIO JACOBŒA, LINN. RAGWORT.
Showing portion of the stem, flowers and buds, the root and a root leaf.

in other countries such as New Zealand, Canada and Asiatic Russia. It flowers in the late summer, lasting late.

2. *Toxic Principles of the Plant.*—Investigations regarding the toxic principles of Senecio have been made by Cushney and Watt[1]. From the *Senecio latifolus* of South Africa they isolated two alkaloids, senecifoline and senecifolidine, and investigated their action on the laboratory animals, chiefly cats. They found that large doses stimulated the higher divisions of the central nervous system, but that smaller doses, given either per os or subcutaneously, produced symptoms corresponding with the disease produced by the action of the plant itself. The changes in the liver were interpreted as those of early cirrhosis. They also found that *Senecio jacobœa* was as poisonous as the *Senecio latifolus* and that it contained similar alkaloids, and that the *Senecio vulgaris,* the common groundsel, resembled *Senecio jacobœa* in regard to its toxicity and the symptoms it sets up..

3.—*Discussion as to the likelihood of Poisoning by Ragwort.*—Although it may be accepted that ragwort is poisonous and contains toxic alkaloids, actual poisoning by this

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plant is often queried and it is often difficult to convince farmers that trouble arises from this cause. Frequently they will state that these plants are common in places where no trouble has arisen or where no previous fatalities or illness could be laid to the door of ragwort. The explanation of this observation is, however, perfectly simple. Cattle or horses will not eat green ragwort when other green herbage is abundant, the grass is of good quality and in great abundance during the summer months, and they are not likely to become affected during the winter when they are well cared for and the hay contains few if any weeds. But it must be pointed out that these animals are forced to feed upon ragweed when it overgrows the land and there is a scarcity of green grass on the pasture as in conditions of drought.

Moreover, the animals cannot avoid picking it up in the dry condition when the hay is highly contaminated, and it must be confessed that in all probabiltiy it is the hay which is incriminated in a good many outbreaks of poisoning, the losses occurring in the early portion of the year.

4. *Development of our knowledge of Ragwort Poisoning.*—Our knowledge regarding the causal relationship of ragwort to losses among stock is only of a recent origin. To Gilruth[2 & 3] working in New Zealand, we are indebted for much of our information, and his observations are recorded in his annual reports for 1902-3 and 4. In New Zealand it was observed that in districts where ragweed (*Senecio jacobœa*) was abundant and outgrowing the rest of the herbage at pasture, losses were being sustained among cattle and horses and the most constant lesion in these cases was cirrhosis of the liver. Gilruth described some of the outbreaks and was able to produce the disease experimentally in horses and cattle. The disease was called "Winton disease," after the neighbourhoood in which it first appeared among horses. The description of the symptoms in cattle is not very clear. These symptoms, as described, comprise a peculiar odour from the animal's skin, complete oblivion to its surroundings, decrease in the milk supply and a peculiar flavour of the milk, rapid emaciation, voracious appetite or loss of appetite more or less pronounced, jaundice, diarrhœa sometimes, want of co-ordination, excitement even to frenzy and death in 2 to 5 days. The *post-mortem* appearances were similar to those which we will note in the clinical cases found in this country.

Gilruth also demonstrated, as the result of his experiments, that ragwort was equally poisonous whether given with hay when it was cut and dried while in flower, or picked up when green on the pasture. On the other hand, in experiments with two cows and a horse no change was produced by feeding with the plant even in large quantities when it had withered after seeding and was completely dead.

It was popularly believed that sheep were highly resistant and ate the plant at any stage with evident relish and apparent impunity. On that account they were often grazed over badly-infected land to crop down the plant. The resistance was shown, however, not to be absolute and some fatalities were experienced from feeding on ragwort when the latter was in great abundance in pasture.

Some observations were also made as to the amount of ragwort which had to be devoured before symptoms developed. In calves, 102 lbs. of ragwort spread over 17 days were given before the symptoms appeared and in a horse 93 lbs. spread over 84 days. It was also observed that in some of the outbreaks of ragwort poisoning deaths occurred for nearly two months after removal from the ragwort area. This suggests that there is a latent period in this form of poisoning, corresponding with the period of incubation in a contagious disease.

In the Pictou district of Nova Scotia, liver cirrhosis of cattle has also been described. It is therefore called Pictou disease and is always associated with feeding on the *Senecio jacobœa*.

Molteno cattle disease in South Africa has been ascribed by Robertson[4] and others to poisoning by one or other of two species of ragwort, *Senecio latifolius* and *Senecio burchelli*.

In 1917 Stockman[7] recorded the first cases of poisoning of cattle by British ragwort, detected in Great Britain. These cases occurred in a herd of 24 store cattle at pasture, which, owing to the severe weather in the early portion of the year, were fed with hay containing large quantities of ragwort (*Senecio jacobœa*). The feeding began on the 21st February and was continued till 17th April—55 days. No estimate could be given as to the amount of weed consumed by the cattle. The first animal to show symptoms did so on the 6th April, 44 days after feeding commenced, and died in 24 hours. The losses continued at intervals and up to 24th May, 13 animals had died, two had been ailing for three weeks and one other for a fortnight and looked like dying. No animal had recovered after the first appearance of the symptoms. The animals died at intervals of one to eleven days after the first appearance of the symptoms and visible signs of illness were observed in some cases up to three weeks after feeding on ragwort had been discontinued. The symptoms in the more acute cases were unthriftiness, absence of control over movement (staggering gait), impaired vision and nervous excitement, which in some cases amounted to frenzy dangerous to the attendants. The pulse was frequent and weak. Some animals showed diarrhœa, but most of them suffered from severe constipation accompanied by violent straining.

The chief lesions noted at *post-mortem* examination were enteritis, dropsy of the omentum or even ascites, small hæmorrhages in the substance of the pericardium and the mucous membrane of the bowel, and cirrhosis of the liver.

Another series of cases of the kind was described in Great Britain, 1926, by Leyshon[8]. Two calves, two cows and a gelding died. The source of the poisoning was hay rich in ragwort (*Senecio jacobœa*) in the late flowering stage. The feeding began in December and continued till 9th April and it was estimated that one cow and the horse each consumed about 110 lbs. of ragwort. The first calf died in February, the second heifer on May 9th, the gelding about the same date, a cow on May 22nd and the second cow on the 15th June. The first cow showed symptoms 39 days and the second 59 days after feeding with the plant had ceased.

The lesions found were similar to those which we will describe in the cases we have observed in this country.

5. *Observations on Ragwort Poisoning in Ireland.*—During the present year we have investigated several series of cases among cattle in which all the circumstantial evidence points definitely to ragwort (*Senecio jacobœa*) as the cause. For much of the information in connection with

these cases we have had to rely upon the veterinary practitioners who brought them to our notice. These cases were confined to County Dublin and the neighbourhood and it is not improbable that the losses from this cause were not confined to this area in the Irish Free State. Perhaps some of them escaped detection. One naturally wonders whether this has been an abnormal year or whether losses due to ragwort have gone undetected in previous years. In the description of these cases I will take each series separately and note exactly what we found and any history and symptoms which could be obtained in connection with them. It must of course be stated that in no instance have we been able to obtain information from which might be estimated the amount of ragwort which was devoured before symptoms were produced. The following are the details of the outbreaks :—

Series 1.

Cases 1 and 2.—On the 19th March last, two dead yearling calves, one a bull, the other a heifer, were forwarded to the College for *post-mortem* examination. They came from a herd of 20 cattle in County Dublin. The cattle of this herd were mostly calves varying from 4 to 12 months old, but three of them were cows. They had been fed on hay and the younger ones had also been given milk and cake.

History.—The symptoms shown by the affected cattle were—loss of condition, poor appetite, constipation (save in two calves, which had a yellowish white diarrhœa) straining (a constant symptom), blindness and towards the end in one case excitement. Death occurred in two or three days after marked symptoms appeared. Up to this time 8 cattle had died and two more were ill. These losses had been experienced over a few weeks.

A Post-mortem Examination of the two calves was made within twenty-four hours after death. In both carcases the lesions were almost identical. They comprised :—poor condition, slight œdema of the tissues, the presence of a slight yellowish limpid fluid in the *serous cavities* estimated at two to three pints in the peritoneum and about five ounces in the *pleura* and *pericardium,* petechiæ in great numbers dotted over the lower portion of the *mesentery,* parts of the *omentum,* over the *mediastinum* and over the base of the heart under the *epicardium,* slight œdema of the lymphatic glands, fine cirrhosis of the liver. (The liver was yellowish brown in the heifer and brown in the bull. Capsule opaque, liver very firm and hard, could not be punctured with the finger and was difficult to incise with the knife. On the cut surface the lobulation was distinct and a greyish network, inperfect in formation, was noted through the liver tissue. Bile ducts were not dilated or otherwise changed and liver flukes were absent.)

Kidneys.—Some reddening of the medulla and glomeruli distinct.

Lungs.—One lung dark red (hypostatic congestion) and in the other lung a small area of pneumonia affecting the special and cardiac lobes. This was probably an independent condition. Heart cavities in diastole and filled with black clotted blood. Heart walls firm and brown. One small hæmorrhage under *endocardium* of the left ventricle in the heifer near the papillary muscle.

Rumen and *reticulum* full of hay and a few oats ; contents very dry in one animal. In the other a number of strong tough stalks of the plant, ragwort. In the heifer there was a considerable amount of œdema under the mucous membrane in one area of the rumen.

Abomasum contained only a little food. The folds of mucous membrane were œdematous and three or four times their normal thickness. The fluid poured out of the submucosa on section.

In the *small intestines* there were patches of congestion and petechiæ in the mucous membrane. In addition, in the bull calf the posterior part of the rectum was greatly reddened, swollen and protuded and the mucous membrane of the *large intestines* was slightly swollen and œdematous.

In the heifer an accidental lesion was found in the form of a chronic abscess in the liver about the size of a hen's egg, and a piece of wire about 1½ inches long was present in the rumen. The lesions suggested ragwort poisoning and a sample of the hay was got for inspection. This hay had been fed to the cattle for at least two or three months previously. In the hay there were numerous specimens of the *Senecio jacobœa* in the flowering stage and in the dry state. These plants were known to have been very numerous on the fields from which the hay had come and, according to the herd, it was impossible to eradicate them. The field was therefore put into meadow and the grass cut for hay. It was also stated that no previous losses of a like nature had ever been noticed in the place.

It was recommended that this hay be abandoned for fodder and that the remaining cattle be given a laxative. This, however, did not appear to have any action in preventing the appearance of further cases. Afterwards, when symptoms developed in other animals, these were sent to the abattoir and we had thus an opportunity of making an examination of five subsequent cases, and we propose to give a brief account of the findings in each case.

Cases 3 and 4.—A cow and young calf under six months old slaughtered on the 27th March. Both were dull and listless and not feeding for some time before slaughter.

Lesions.—In the cow there was some serous fluid in the *peritoneum* with œdema of the *mesentery* and *omentum.* Mucous membrane of the *abomasum* was studded with small petechiæ over the pylorus, the folds were œdematous and two or three times normal thickness. *Liver* was light brown, very firm and difficult to cut, but not so firm as in the previous cases. Lobulation distinct, a grey imperfect network being evident over cut surface. Bile ducts not enlarged.

In the calf the lesions were similar but petechiæ on mucous membrane of *abomasum* were not so numerous as in the cow, and the pyloric portion was blotched pink. No fluid in the *peritoneum.*

There were a few hæmorrhages under the *epicardium* over the coronary groove and under the *endocardium* over the papillary muscle of left ventricle. *Liver* dark brown, capsule opaque. Liver extremely tough, lobulation distinct. Wall of gall bladder œdematous and mucous membrane dotted with petechiæ.

Case 5.—A cow about ten years old. Condition poor and mucous membranes rather pallid.

Lesions.—*Mesentery* œdematous and jelly-like. Small hæmorrhages dotted over serous surface of *caecum.*

Rumen.—Mucosa of the rumen dropsical and gelatinous. Contents chiefly grass and some oats. No ragwort found. A few small blood clots mixed with contents.

Abomasum.—Contents nearly black and soft. Folds greatly

thickened and œdematous. When incised, serous fluid flows out of them in a stream. In section of fold of mucous membrane of abomasum examined under the microscope, epithelium and mucosa quite normal but strands of fibrous tissue in the submucosa have been torn apart by the fluid already noted.

Liver brown, hard and cirrhotic. Serous covering opaque. On section grey specks and fine grey network through liver substance. No enlargement or thickening of bile ducts.

Case 6.—A cow slaughtered on the 22nd April, 1929.

Over 8 years old, heavy in calf and in moderate condition, coat dry, visible mucous membranes pallid, temperature 102·6° F. It was down when seen and experienced great difficulty in rising. When got up, it staggered in its gait and soon fell down again. Vision appeared to be impaired but not lost. The pupils were slightly dilated. There was no diarrhœa.

Lesions.—Peritoneal cavity contained about a quart of dark yellow serous fluid. A few large hæmorrhages were scattered over the surface of peritoneum.

Mesentery slightly œdematous and mesenteric glands moist.

Abomasum.—Folds of mucous membrane slightly thickened and œdematous. Contents very dry.

Rumen.—No ragwort identified.

Kidneys mottled on surface, light brown, very firm. Alternating light and dark striae on cut surface of vertical section of cortex.

Urinary Bladder, a few petechiæ on mucous membrane.

Liver.—Capsule thick and opaque. Substance almost leathery in consistence. Lobulation very distinct. Colour brown. Light grey striæ separating the lobules, forming a network. At lower border of liver, substance completely fibrous and large bile ducts thickened, suggesting that, in addition to ragweed poisoning, the liver was also affected with lesions of an old infestation with liver flukes.

The *uterus* contained a fully-developed fœtus.

Case 7.—Six-years-old cow. Condition poor.

Liver brown, very firm. On section, cut surface studded with grey spots and streaks forming an incomplete network. Lobulation distinct.

Abomasum.—Mucous membrane dotted throughout with small hæmorrhages.

Cæcum.—Œdema of the submucosa.

Heart.—Some hæmorrhages under the endocardium of left ventricle.

Series 2.

Among a bunch of 12 bullocks, one two-year-old black polly was noticed on April 8th, 1929, to be staggering and almost blind. When approached, it became violent and was destroyed. No expert *post-mortem* examination was made, but a piece of bowel and mesentery brought for examination showed œdema, and petechiæ dotted over the lower portion of the mesentery. On the same day a second bullock of the same bunch was found to have diarrhœa and to be off its feed. Next day the eyes were staring, the bullock was not inclined to move, the diarrhœa was thin and black. The temperature was 104° F. The animal was given chlorodyne, carbolic acid, linseed oil and paraffin. On the 12th it was down in convulsions and frequently straining. It was then destroyed and a *post-mortem* examination carried out.

Lesions.—Mesentery œdematous and studded with petechiæ.

Liver cirrhotic, brown, very firm. Lobulation distinct and a fine grey network through the liver substance.

Stomachs showed no change.

This lot of cattle were at grass in the daytime but were taken in at night and given hay.

A sample of hay was brought in for inspection but contained no ragwort. It was, however, ascertained that the hay had recently been changed and that the former hay used was full of weeds. Moreover, it was stated that the grass on the land was very backward and ragwort was abundant.

Series 3.

The cattle on this farm had been feeding on hay containing ragwort since the beginning of February, 1929, During the week including May 9th, one bullock became ill, showed diarrhœa with straining, staggering gait, loss of appetite and poor condition. It died in a few days after becoming violent.

Only a piece of liver from the carcase was brought for examination. The *liver* was light brown and very tough and the cut surface presented on section a light fine grey network through it.

On May 11th another bullock, a two-year-old from the same farm, was sent to the abattoir. It had been in poor condition, scouring and straining for a few days.

On destruction the following lesions were found :—

Abomasum.—Folds of mucous membrane œdematous and hæmorrhages over pylorus. *Rumen and reticulum* full of hay. No ragwort detected.

Liver, brown, very firm and tough. On section, a fine grey network seen through the liver substance and lobulation distinct. In the lower portions bile ducts somewhat enlarged.

It was reported that two cows subsequently became affected in the same way, but no *post-mortem* examination was made.

Series 4.

The liver, stomachs and intestines of a six-months calf were forwarded for examination on June 13th, with the history that this was one of three cattle about the same age which had recently died. The cattle had been out at grass since May. The symptoms described were that the cattle had glassy, staring eyes, were not feeding, were constipated, and in one there was protrusion of the rectum. The gait was staggering. Death followed in two to four days.

Lesions observed were :—

Liver, fine cirrhosis as in previous cases.

Abomasum, folds of mucous membrane œdematous and thickened. *Rumen and reticulum* full of coarse grass.

Subsequently, it was ascertained that there were 13 cattle from six to seven months old in the herd, and they had been fed from March to April on hay full of ragweed. They were then put to grass. The first case of poisoning appeared and died three weeks after the feeding with the contaminated hay had been discontinued and four or five cases about the fifth or sixth week.

All the 13 cattle died, the last case nearly three months after the animals had been put to grass.

Series 5.

The carcase of a blue-grey polled yearling bullock was

forwarded to the College on September 13th for *post-mortem* examination. The history of the case was that it had commenced to cough two or three weeks ago and developed a scour. It then recovered, but commenced to waste although it fed well. On the twelfth week it became weak and staggered in its gait, walking very fast with the neck stretched out. When standing, it often kept its head pushed against the wall. The eyes were somewhat protruding and the ears hanging. Straining was constant. The bullock died on September 13th. Five younger calves showing almost similar symptoms had already died at intervals of one month since May last. They all strained continuously before dying.

Lesions Observed :—

Lungs, some hypostatic congestion. No strongyles in bronchial tubes.

Heart flabby and filled with black blood clots.

Peritoneum, a little serous fluid present.

Liver light brown, very firm and difficult to incise with a knife. Lobulation distinct. Bile ducts normal. *Gall bladder.*—Mucous membrane dotted with little nodules, size of pinheads.

Rumen and reticulum full of coarse grass among which a few stalks of ragwort were recognised.

Abomasum nearly empty. Folds of mucous membrane œdematous.

Small intestines.—About the middle portion, the mucous membrane was slightly congested.

In this series ragweed was common on the pasture and in the hay fed in the early portion of the year.

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Observations on Ragwort Poisoning in Cattle.

By J. F. Timoney, m.r.c.v.s., Strabane.

I generally observe five to six cases every year in animals commonly from about 12 to 15 months old. It is usual for one case only to occur on any farm in this district, but occasionally two cases of the disease may occur, and in very occasional outbreaks several animals may be affected. Such an outbreak I encountered in 1927, where a number of cows and calves (six in number) all became affected, not simultaneously, but at periods ranging from two to four weeks between each individual case. I have had only one case where the animal's principal ration was hay, but in this instance the animal was allowed to graze for a few hours each day in pasture which was very short of grass, it being in the very early spring. Most of my observations are confined to the occurrence of the disease in cattle on pasture during the spring and summer seasons. The grazing is always short and land frequently overstocked. As in liver cirrhosis in horses, the owners are often not good feeders of their stock, and when disease is noticed in the spring season it is generally apparent that the animals have been inadequately wintered.

The common ragwort can be always recognised in the young rosette stage in the spring, in the year-old non-flowering and two-year-old flowering stages in the summer season, and this plant can always be obtained in abundance in any form where the disease occurs.

In one instance last summer, the two-year-old plants were cut by the reaping machine, and left lying in the field in which were grazing a number of young calves, one of which exhibited definite symptoms about a fortnight afterwards.

The disease proved invariably fatal in all cases observed. Specimens from one case, consisting of abomasum and liver, were dispatched to Professors Craig and Kehoe for examination, and cirrhosis of the liver was confirmed on histological examination.

Clinical Symptoms.—These consist of staggering gait, prominent eyes, pupils sometimes dilated, with absence of pupillary reflexes and corneal reflexes sluggish or absent. Insensibility to pin pricks is generally present. The affected animals frequently appear to be blind, as they often wander up against wall, manger or any obstacle near them with the head pressed against it. In other cases, vision does not appear to be impaired, or, if so, only slightly, since the animal avoids stationary objects. The pulse is increased in frequency and may reach seventy beats per minute. The respirations and temperature are normal. Straining is a very important symptom and very obvious. It is not continuous, but is intermittent in character, although the interval which elapses between each spasm of straining varies in the different subjects, and according to the stage of the disease in existence when one is requested to attend the animal. In the early stage the intervals are longer than occur in the later stages.

At each act of straining the abdominal floor is raised, the flanks are bulged out, the tail slightly elevated and an expiratory noise is produced. This straining spasm may last a few minutes and then cease, only to start again in a very short time. Auscultation over the left flank or insertion of thermometer into the anus is often sufficient to excite the spasm. The animal generally remains stationary when straining, and is difficult to get it to move when in the act. Movement inhibits it to a degree, and at the beginning it will often abort the spasm, but as the disease advances the animal will strain in spite of forced movement, although not so profoundly as when left unmolested. In the early stage the anus is not everted, but as straining develops in intensity and in frequency the anus is often everted, when it may be discovered swollen and perhaps bleeding, partly as a result of intense congestion, and chiefly as a result of injuries it receives in the course of the animal's meanderings around the box.

In the beginning of the disease the appetite is not much impaired and the chief symptom to attract attention is the intermittent but frequent straining.

When the disease is well established the appetite is practically in abeyance as far as solid or dry foods are concerned, but the animal will often accept water or a meal mash, and here it is frequently observed that the animal plunges its head into the feeding bucket, sometimes to the extent of immersing the nostrils, and may finally drink all the water or only a portion of it. Salivation, clamping of the jaws and gritting of the teeth are often observed. Diarrhœa is occasionally observed, but only in older animals and the general rule is that fæces are normal but passed in small quantities owing to frequent straining. As the disease advances the staggering gait becomes extremely marked, as does the tendency to wander into fixed objects. The animal appears to be insensitive to pain. It may be discovered standing in quite a variety of awkward positions. Finally it falls and rises again, only to fall again, and when *in extremis* it is discovered

with head and neck drawn back or in a state of extreme extension, saliva flowing from the mouth and making convulsive movements with all limbs.

Regarding the course of the disease, in the majority of my cases, which were practically all in young cattle, death occurred inside from two to ten days.

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Histological Examination of the Livers.

A large number of sections were prepared from the affected livers and subjected to a microscopic examination. In all cases the type of lesion was the same and varied only in degree and extent. The lesion was a fine cirrhosis which tended to become pericellular. The fibrous capsule of the liver was greatly thickened and from it fibrous trabeculæ passed inwards between the columns of liver cells of the superficial lobules. Thick, often dense, fibrous strands accompanied the branches of the portal vein through the liver and from them fine fibrous striæ passed into the lobules between the columns of liver cells, separating them into clumps and even surrounding individual liver cells in the advanced cases. In this way the distinction between individual lobules became confused. There was also frequently a considerable distension of the intra-lobular sinusoids with blood, especially around the intra-lobular veins. This distension also tended to compress and separate columns of liver cells. In many places also the intra-lobular and sub-lobular veins were surrounded with a fibrous covering of variable thickness.

The liver cells in many places were undergoing atrophy, in some sections some of them were hydropic or contained fat droplets. The small bile ducts were also abnormally numerous in the thick interlobular tissue, suggesting that many had been newly formed. At various points in or between the lobules of many sections there were round, oval or oblong spaces filled with liver-cell-débris, mononuclear and polymorphonuclear leucocytes and some red cells. Some of these spaces had a distinct endothelial lining.

The congestion of the sinusoids was not so marked in some of the advanced cases.

6. *Conclusions.*—I think it must be concluded, from all the circumstances connected with these series of cases, imperfect though some of the information may be, that the losses here recorded are due to poisoning by ragwort (*Senecio jacobæa*). It will be noted that, as compared with the symptoms given by Gilruth, in no case was jaundice a symptom, nor was any reference made to any peculiar odour from the skin. That was the experience also in Great Britain.

In the first series it is apparent that some of the cases continued to crop up for some time—up to 61 days—after feeding with the hay containing ragwort had been abandoned and there is some evidence that the latent period was even longer in some of the subsequent series.

7. *Prevention and Treatment.*—There remains to be considered the problem of prevention of and treatment for ragwort poisoning.

As for treatment, we know of no specific agent that may have some beneficial action as an antidote, chemical or physiological. It is usual to recommend a laxative or purgative and follow with tonics or stimulants. In all cases where losses have occurred it is necessary to take the cattle off the pasture where ragweed is abundant or discontinue the use of contaminated hay as the case may be. A purgative may be given, but we have evidence that this does not effectually prevent the appearance of further cases.

The further recommendation is directed to the extermination of the weed from the pasture. According to McGovern, ragwort is a biennial plant and propagates by seeds alone. Its eradication may therefore be effected by preventing it from seeding. This may be done in one of two ways:—

(1) By cutting the plants in the flowering stage twice in the year, the first cut being made early in July and the second about six weeks later or (2) by pulling the plants early in July before seeding occurs. If pulled later the plants must be collected and burned to prevent seeding.

From what has been said regarding the damage it is doing, it ought to be urged that the eradication of this plant should be enforced as a compulsory measure.

B.—Cirrhosis of the Liver in Horses.

In 1921 Professor Kehoe and myself (9) published, in *The Journal of Comparative Pathology and Therapeutics*, an account of a disease in horses in Ireland under the heading of "Cirrhosis of the Liver." We then described four cases which had been brought to our notice by Messrs. Connolly and J. F. Timoney, M.R.C.V.S., who were familiar with the affection in County Louth. We pointed out at that time the striking resemblance that this affection presented to schweinsberger disease in Germany, to Winton disease as it appeared in horses in New Zealand, and to dunziekte in South Africa. Since that account was published we have been brought into touch with 20 further cases of the disease and we have evidence that cirrhosis of the liver in horses is found not only in Louth, but also in Donegal, Tyrone, Monaghan, Fermanagh and Leitrim.

As regards the cause, we have no definite evidence as to its exact nature; we believe it to be some form of vegetable poison and we are greatly impressed with the fact that ragwort can set up symptoms and lesions which are similar to those observed in cirrhosis of the liver in horses in this country. We have, however, yet to observe that the affected horses actually consumed the weed prior to the appearance of symptoms and we have also to point out this peculiarity as contrasted with ragwort poisoning in cattle, that the disease in seen chiefly in adult or old horses. Moreover, it is not usually associated with the disease in bovines.

I should like to refer to one experiment carried out by Gilruth to show the effects of ragwort (*Senecio jacobæa*) on horses. The ragwort was cut when in bloom and carefully sundried, and the stems discarded. One pound was given to a horse daily for 28 days, when he exhibited some loss of appetite and then the quantity given was reduced by one half. This was continued for 21 days, when he appeared to be languid in his movements and the appetite depraved. The dose was then further reduced to ¼-lb. daily for a further 34 days, when feeding was discontinued. The horse had thus consumed 93 lbs. of dried ragwort in 84 days. The animal lost condition slowly and the pulse became slower, slightly intermittent and irregular. On the 77th day it showed very slight want of muscular inco-ordination. On the 84th day the eyes were

amaurotic, the conjunctiva was injected but not yellow, the mouth clammy. The fæces were hard, passed seldom and in very small quantity. Mastication was performed very slowly and the animal occasionally yawned. It was drowsy; when standing there was a slight swaying motion of the body and, when walked round, an occasional but distinct stagger. On the 85th day the symptoms were more distinct. The fæces were hard, the bowels very sluggish. The urine was thick, high coloured and had an offensive odour. Yawning was more frequent. Staggering was more evident in the hind limbs. The appetite was capricous and the animal would chew dung-stained straw fairly readily but would only turn good hay over with his lips, pick up a few stalks, masticate slowly for a few seconds, and stop. He would continue to stand over the hay as if oblivious to his surroundings. Drinking was accomplished very slowly. On the 86th day from the beginning of the experiment the animal was decidedly worse. The horse was standing drowsily with his head resting on the manger and pressed against the wall. The body swayed considerably with frequently sudden jerks as if attempting to keep from falling. The animal passed rank, viscous, offensive urine but no fæces. The eyes were very amaurotic and half covered by the upper eyelids. The animal moved as if drunk. A new symptom was the stamping of one or other of the hind feet suddenly, spasmodically and violently without apparent cause. If approached he might make feeble attempts to rush one. The breathing was slightly stertorous and the heart beats rapid and irregular.

The horse was therefore destroyed. The lesions found *post-mortem* were identical with those to be described for cirrhosis of the liver in this country.

In South Africa dunziekte has been attributed to two species of ragwort (*Senecio burchelli* and *latifolius*) and it has been shown that ragwort, there, is toxic for horses when given in doses of six to ten ounces daily spread over a period of from 50 to 125 days. When the symptoms appeared, the horses died within a few days. It was also surmised that the changes in the liver progressed after discontinuing the feeding and it was noted that symptoms might not arise for 20 to 96 days afterwards. Theiler (5 and 6) drew the conclusion that dunziekte was not senecio poisoning, on account of the acuteness of the illness and the degenerative changes in the heart and kidneys seen in the experiments. On the other hand, it may be that if the doses given had been smaller the latent period and the course would have been correspondingly longer.

However that may be, that is the position of our knowledge regarding the causation of the disease elsewhere in horses, on which Mr. Timoney is now going to give us his clinical observations.

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Liver Cirrhosis in Horses.

By J. F. Timoney, M.R.C.V.S., Strabane.

Liver cirrhosis in horses is an affection fairly frequently encountered in at least certain parts of Ireland, and is recognised by agriculturalists under such popular names as "Staggers," "Stomach Staggers," "Grass Staggers," "Sleepy Staggers," "Belly Staggers," "Head Staggers," and "Brain Fever." The first three names are the commonest ones in vogue, the word "staggers" being apparently derived from the commonest and most obvious symptom in a typical case of the disease.

From inquiries made in several districts in which I have definitely diagnosed the affection I elicited the information that a disease in horses, exhibiting similar symptoms, existed as far back as 22 years ago. Clients who have had recent experience of the disease have frequently told me that they had lost horses affected with "staggers" as far back as 20 years ago, and one farmer as long as 22 years ago. I have been informed by farmers, in districts where the disease is frequently encountered, that cases of the disease have been much more numerous during recent years than obtained some 15 to 20 years ago. I have also been told that the disease was regarded as a very rare affection years ago, was generally regarded as being associated with old age, and was unknown to occur in young horses. There is no doubt that the disease has been in existence for a great number of years, and that it has been, in a great many instances, confused with a number of other equine affections, and it is even probable that cases of equine liver cirrhosis are more numerous to-day than obtained 20 to 30 years ago. I may also state that the disease has always been regarded as being invariably fatal.

My attention was first drawn to the existence of the disease in County Louth, in October, 1920, where I definitely diagnosed the disease in a 13-years-old mare by *post-mortem* examination, most of the organs from which animal were dispatched to Professor Craig and to my late and esteemed teacher Professor Kehoe for further detailed macroscopical and microscopical examination. From October, 1920, inclusive to the present month, I have encountered fifty cases of the disease, although I have heard of several others. All of those fifty subjects are dead, nine of which were encountered this year. I have conducted *post-mortem* examinations on 22 of the above 50 subjects, and, at the request of Professor Craig and Professor Kehoe, I have had one gelding suffering from the disease dispatched to the Veterinary College for clinical observation and *post-mortem* examination, in addition to numerous specimens, which always included a liver or sections of a liver, from the majority of my *post-mortem* subjects.

Geographical Distribution.—I observed my first two cases in County Louth, and the remaining 48 were, all except one observed in the north-west portion of County Tyrone and eastern portion of County Donegal, in areas in the former county, some of which were bordered and most of them drained by the Derg River, and in areas in the latter county drained by the Finn River. Forty-two cases one, observed inside an area with a radius of approximately six miles in north-west Tyrone, and inside that area there is a small sector, which is honeycombed with centres of the disease, and which is notorious for the number of definitely diagnosed subjects of liver cirrhosis. Over 40 farms on which the disease was observed, were at an altitude from 125 to 400 feet above sea-level.

Conditions under which Disease was observed.

Districts.—All the farms on which the disease has occurred are tillage farms which are cropped in the ordinary rotation, and have varied in acreage from as low as 20 to as

high as 200 acres, with an average of about 50 acres. The following is the general order of rotation of crops as practised in the Derg and Finn valleys, and the same order pertains to areas where subjects of the disease were located. The order of rotation is as follows, beginning with the breaking up of lea grass, which is generally only three years old, but occasionally four years old: (1) first crop lea oats; (2) occasionally a second crop of lea oats or flax; (3) potato or turnip crop; (4) oat crop, and grasses and clovers are laid down this year; (5) hay crop, known as first crop hay or first cutting, occasionally grazed and is then known as first year lea grazing; (6) second year lea grass or grazing; occasionally the land is not grazed and a second hay crop is obtained; (7) third year lea grass or grazing; (8) fourth year lea grass or grazing. As a general rule the land is only allowed to remain in grass for three years, but occasionally is allowed to remain for four years. I should now state that, although all the farms on which the disease occurred are tillage farms, and where in the majority of cases every available acre is tilled in the ordinary rotation of crops, there are a few farms where permanent grazing exists, and these permanent grass areas are in many cases reclaimed bog lands, which are periodically top dressed with farm fertilisers and used for the production of meadow hay, but which are frequently grazed after hay has been harvested. In a few farms some of the grazing pastures were low-lying and marshy, due to defective natural drainage. It is remarkable that I have never observed a case of the disease on a mountain farm, where tillage is naturally very limited, where the bulk of the grazing consists of permanent virgin pasture, and where the hay commonly used is of the meadow variety. In three instances the disease has been encountered on farms where a portion of the lands on which animals had been grazed is subject to inundations by the Derg River; but the vast majority of the cases occurred on farms where low-lying marshy and flooded pastures are ruled out. On making inquiries and from surveys at different farms as to the nature and quality of the grazing on which affected animals may have grazed at some period of their careers, I have practically always received the information, and have noted, that animals had been grazed on either first, second, third or fourth year lea grass, and had very seldom access to grazing on old natural meadows or low-lying damp pastures. There was one conspicuous feature common to the majority of affected farms, and particularly striking in several instances, and that was, that the grazing was of a very poor quality, the very short, good grasses and clovers being very scarce, and that plants commonly regarded as weeds were common. As a general rule, the farms were located in a low productive area, and where a farm was located in a good agricultural area it was always apparent that the farmer was non-progressive, as reflected by the poor state of cultivation of the land and poor condition of his live stock. However, I have also noted the occurrence of the disease on farms where the owners are beyond reproach in the methods of feeding their working horses, but where a yearling, two-year-old or brood mare has to be kept during that non-useful period of its career, one frequently finds on close examination that such animals have been relegated to the poorest quality of grazing on the farm, and often receive very little additional feeding during the winter and spring seasons.

I have never observed the disease on a tillage farm with a good quality of land, with well-seeded pastures; where due attention had been paid to the grazing and quality of hay fed to the horses, where over-stocking had not been permitted, and where a change to fresh pasture had been always possible.

I have observed the occurrence of the disease in stabled animals and in animals on pasture. I have observed it in a few animals which had not received grass for two years previous to the onset of symptoms, and I have observed 18 cases of the disease where the affected animals had been continuously on pasture for several months. It is interesting to note that five of those 18 animals were brood mares and that five others were three years old and under. I have observed the disease in an animal that had not been on pasture for the previous five years, but which animal received every year a certain quantity of grass in the latter end of May, June and July cut from sides of banks, ditches, a corner in a field which had not been cultivated, and also from the outskirts of a field of new grass previous to its being ready for cutting for hay, and which grass was then mixed through the daily ration of first crop hay. I have always observed that first crop hay and occasionally second crop hay has always been used as the principal fodder, augmented by straw in some cases and with meadow hay in a few other instances. This method of feeding is easily understood when one considers that the districts in which cases occurred are essentially tillage areas.

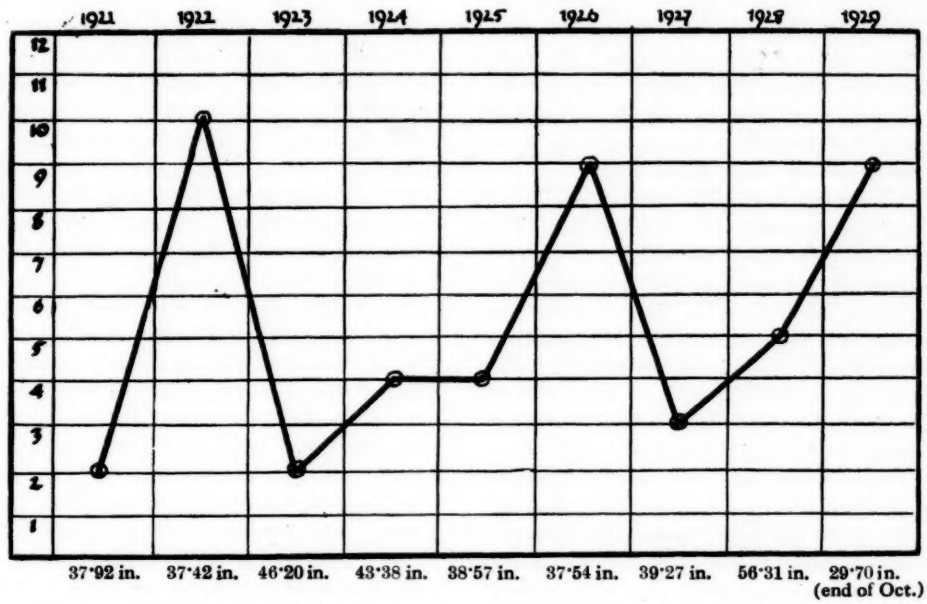
I have observed the disease in two animals, one a 15-months-old foal and the other an aged gelding, which had been grazed on three fields of temporary grass in September, 1928, the foal having died a few weeks before its older companion. The dam of the foal and a number of young cattle had also been grazed on these fields, which were small in acreage with grass very short and full of weeds, the most conspicuous being the first and second year old stages of the common ragwort plant and the *Lotus major* (the latter plant is not regarded by all authorities as a weed and is even regarded by some as a valuable addition to sheep pastures). The animals had access to all three fields. The foal and its dam had been grazed on them from the beginning of the grazing season and the aged gelding from the beginning of June. The dam is still alive, and has so far presented no symptoms indicative of liver cirrhosis.

Annual Incidence.—I have had two cases of the disease, the first occurring a very short time after the second, on the same farm in the same year, but the general rule is that one encounters only one case on any particular farm and the disease may not then appear on that farm for several years. However, there are exceptions to this rule, since I have diagnosed the disease in the years 1922, 1924 and 1928 on the same farm. I have encountered the disease on farms where, according to the owner, it had never previously occurred. The average number of cases I have observed per year from May, 1921, inclusive, to November, 1929, is 5·5 (approximately). Of course, the number of cases that occur annually even within my district is very much greater than the number

Disease—Liver Cirrhosis in Horses.

Observational period: 18th May, 1921—19th November, 1929.

Chart showing Yearly Occurrence Curve with Rainfall Recorded for each Year.



Number of Subjects of Disease received each year from 18th May, 1921, to 19th November, 1929.

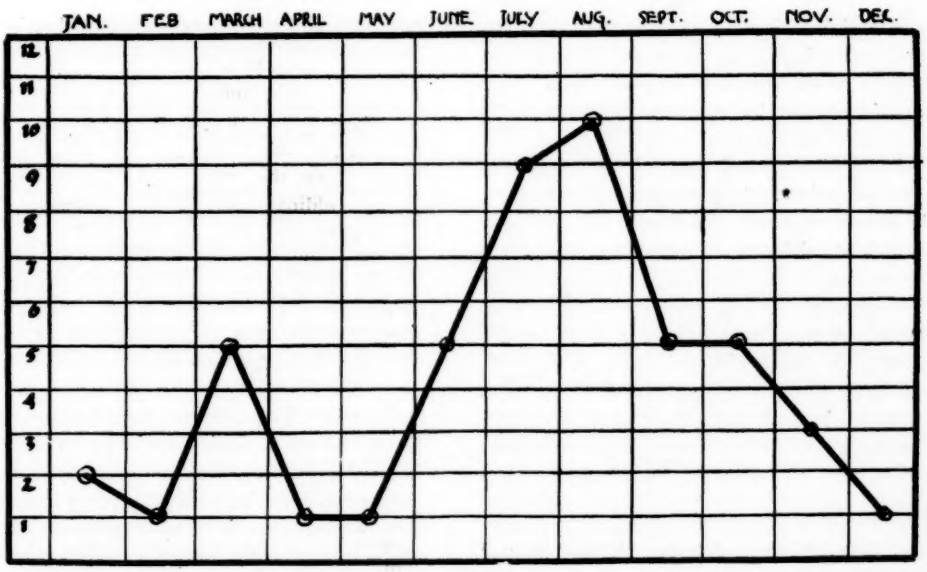
Rainfall as recorded at approx. eight miles distance from area in which cases were observed.

Observations.—The occurrence of the disease appears to be associated to a considerable extent with the rainfall. A light rainfall, or, in other words, conditions tending towards drought, appears to favour the occurrence of the disease, since the greatest number of cases of the disease have been observed in years with a light rainfall.

Disease—Liver Cirrhosis in Horses.

Observational period: 18th May, 1921—19th November, 1929.

Chart showing Seasonal Occurrence Curve.



Number of Subjects of Liver Cirrhosis observed during different calendar months of observational period.

Observations.—It is significant, as noted from curve, that the greatest number of cases of the disease have occurred in the months of July and August, when most farm horses are on pasture, and the rise of the curve in March might possibly be explained when one considers that, in this area, this is the month when horses are hardest worked and hay is often substituted for straw owing to its higher feeding value.

I have recorded, since a number never receive professional attendance, and I have no knowledge of how many are attended by other veterinarians in the locality.

Seasonal Variations.—From my records, I have found the greatest number of cases to occur during the summer season, particularly during the months of July and August. Of the 48 cases observed in Donegal and Tyrone, 19 were observed during the months of July and August. I have, however, diagnosed the disease in every month of the year, but cases are few in number during the months of November, December and January as compared with what obtains in the summer period (*vide* chart).

Rainfall.—The occurrence of the disease appears to be associated to a considerable extent with the rainfall. The years 1922, 1926 and 1929 claim respectively ten, nine and nine animals, that is, 28 subjects of the disease from the total number of 48. On examining the records of the rainfall for the years 1922, 1926 and 1929, it is noteworthy that these years, with 37·42 in. of rainfall for 1922, 37·54 in. for 1926, and 29·70 in. for 1929 (to end of October), are the years with the lightest rainfall from 1921 inclusive to end of October, 1929. A low rainfall or, in other words, conditions tending towards drought, favours the incidence of the disease (*vide* chart).

Over-stocking and under-feeding.—I have abundant evidence that over-stocking and under-feeding have the greatest possible influence in the production of the disease. It was often not a question of sufficient acreage not being allowed, but a question of the low grazing capacity of the particular pasture, the place of useful grasses and clovers being occupied by weeds. In the case of stabled animals it was generally observed that horses on affected farms showed signs of insufficient feeding. The hay was generally inferior in quality, and, on cross-examination as to the source of origin of the seeds which were sown, I was unfortunately too often informed that they were obtained from the sweepings of the barn loft, or from some local merchant, who took upon himself the responsibility of mixing the seeds. These seeds, being cheaper in price than those from a reliable firm, generally fail to carry any guarantee as to germination percentage. I was frequently informed that there was a " missed " hay crop, and such a crop always carries a large percentage of weeds.

Animals Affected. Breed, Age and Sex.—The disease has been observed in cross-bred heavy draught, medium draught and light draught horses. Its occurrence has been noted in 19 mares and 31 geldings. As regards the influence of age, the disease has been observed in an animal as young as 15 months and in one as old as 25 years. Twenty-eight affected subjects were over ten years of age and 22 subjects were ten years old and under.

Susceptibility of Home-Bred and Bought-in Horses.—The disease has been noted in both home-bred and bought-in horses, and I have no evidence to show that one class is more susceptible to the disease than the other.

Clinical Symptoms.

I have observed what I shall describe as two clinical forms of the disease, namely, an acute form and a chronic form.

Chronic Form.—The chronic form is by far the commoner of the two forms of this disease and therefore shall be described first. It has been noted in 43 animals. In this form in a stabled animal, the previous history generally consists of a slight loss of condition, in animals previously in good condition, associated occasionally with a lustreless coat in spite of any alteration of previous diet or work performed. In other instances, the previous history is to the effect that the animal has been in poor condition for some time, has not reacted to a more generous diet and that his coat has got dry and staring. Again, in other cases, the previous history betrays the information that although the animal has apparently maintained its condition, it had been noted by the owner that the animal was not consuming the same amount of fodder as was customary, this fact being commonly observed by the owner who, on going into the stable in the morning, generally found practically all the fodder which had been placed in the manger or hay rack the night previous, lying and tramped on the stable floor beneath and around the animal's fore limbs. It was generally observed, in these cases, that the animal would often pull most of the hay from the manger on to the floor, eating an occasional mouthful now and again, and when the manger was practically empty, it would finally turn round and often eat its bedding, which commonly consisted of straw. In a very small minority of cases this partial inappetence is not present and the appetite is voracious, fodder being ravenously consumed in large quantities. In one animal, symptoms were ushered in by colicky symptoms of a mild degree, the animal looking round occasionally at its flanks, stamping of hind feet, accompanied by diarrhœa for 12 hours or so, to be followed by an equally lengthy period of constipation. These symptoms continued for a number of days. The appetite in this case was in abeyance during the attacks of diarrhœa, and a number of days elapsed before diagnostic symptoms of liver cirrhosis presented themselves.

As a general rule, in most of these cases the owner suspects the presence of dental trouble, and the common object in bringing the animal for examination is to have the teeth examined. On cross-examination of the owner one does not receive any very definite data indicative of dental trouble. The horse has probably been observed eating its corn quite readily, but is only seen to eat a small quantity of hay, whilst it may have been observed eating its bedding quite greedily. The molars are examined, and dressed if any abnormalities are seen or felt to exist, but in the greater number of cases no irregularities in the wear of the teeth can be detected. The animal is generally brought back for further examination in the course of from seven to fourteen days, and now one occasionally observes that loss of condition is appreciable, the coat is perhaps dry, lustreless and may be staring. The abdomen may be reduced in volume and the flanks are often hollowed. If the animal's movements are watched during progression, a slight inequality of gait will be observed. The information one now receives from the owner is frequently to the effect that the animal fed well for a few days after the first attendance, but that previous indifference in the animal's feeding was again manifest, and usually in a more marked degree. At this period one is generally requested to re-examine the teeth and also to examine the animal for the presence of worms. If one cross-examines the owner as to the animal's behaviour

in the stable, one invariably receives the information that the animal has been seen frequently yawning, and may have been observed standing in the stall or loose box in a forward attitude, as if in heavy draught, with hanging head and partially-closed eyes. These symptoms are generally observed when quietness reigns, as the animal may often assume the normal position when a noise occurs. The owner frequently draws your attention to the droppings, and on examination of these it will be noted that the total daily quantity and the individual quantities passed at each act of defæcation are smaller than normal. The fæcal balls are small, dark brown in colour, with a shining surface, covered with a thick but firm film of mucus, are often facetted in appearance and their property of cohesion is increased. On expulsion from the anus they make a noise greater than usual on falling and generally do not fracture to the same degree as normal fæces, and separate from each other on reaching the ground. On breaking up a fæcal ball, long fibres, up to an inch long, and whole oats are frequently observed. The pulse is normal in the number and character of its beats, so also are the respirations and temperature. The cardiac sounds are normal. The labial mucous membrane may be slightly reddened, but is generally a normal pink colour. The palpebral conjunctival mucous membrane may be slightly reddened, and on examination of the upper sclerotic portion of conjunctiva a faint yellowish tinge is occasionally detected, but this discoloration is by no means distinct and too much importance should not be attached to its presence. The nasal mucous membrane may be slightly reddened, but is generally normal in colour.

The corneal pupillary and cutaneous reflexes are present and active. During this period, and sometimes earlier, temporary improvements are often observed, lasting from a few days to perhaps a fortnight, but rarely longer, except in occasional cases where an improvement lasting for a number of months may occur. An improvement lasting longer than a fortnight is most exceptional. In addition to the already-described symptoms as observed in the early stage of the disease, occasional cases are noted where salivation and champing of the jaws were present, and in these cases the teeth are normal.

From the above-described stage onwards the symptoms become more marked. It is noticed that the animal is steadily losing condition, the appetite being variable—on some days hay is accepted, on other days straw only is eaten, whilst the oat ration may be completely consumed, partly consumed or left untouched. Mashes may be accepted for a week and then refused the following week. In some cases all food is refused for a number of days and soiled bedding is consumed. One may even observe at this stage a decided improvement in the animal's health, but this improvement generally only lasts a few weeks. The owner frequently believes that the animal has recovered, but unfortunately this recovery is more apparent than real, and one invariably notes an exaggeration of symptoms after this temporary period of well-being. Dulness is now very marked, cutaneous reflexes being sluggish and frequently absent. The corneal reflex is sluggish, but the pupils still react to light. The pulse may reach 48 to 50 beats per minute and its character is still normal, so likewise the respirations. Borborigmi may be heard frequently without auscultation. Twitching of the caput and crural groups of muscles is sometimes observed. The temperature still remains normal. Symptoms of a light colicky affection are sometimes noted, and consist in the animal looking round at its sides and lying and rising; these symptoms, however, generally do not last longer than a few hours. A slight non-painful swelling of the abdominal wall and prepuce is rarely observed, so also are vomition and vomition-like movements of the neck and head. Swelling of the lips and muzzle may be observed and does not appear to be caused by trauma, as it may be seen long before any other demonstrable traumatic lesion can be detected on the body. Filling of the temporal fossæ may be detected, but is infrequent and may be overlooked. In occasional cases a pendulous penis, with frequent erections, may be seen, lasting for a few days. In other very rare instances the animal shows a persistent habit of biting at its sides, but never appears to inflict any apparent injury to the skin. However, the typical, prominent and most obvious symptom at this stage is the uncertain gait of the animal, characterised by inco-ordinated muscular action of the limbs. On the animal being moved in a walk in a straight line, his hind limbs will be observed widely separated and the gait is rolling in nature. The feet are lifted in a clumsy manner and put down without precision. Tripping and stumbling over inequalities of the ground surface are frequently observed—to such a degree, in some cases, that one is quite prepared to see the animal fall, but strange to relate this is not often observed. On being asked to stop, it is noticed that the order is not quickly obeyed, and a considerable force is required to bring the animal to a standstill.

It is observed that the position adopted whilst at rest in yard or paddock is somewhat like that of an animal in heavy draught, with the body lurched forward and the fore limbs placed well back. The hind limbs may be placed somewhat behind the body in a degree of extension, or may be well forward, close together, or widely separated. On placing the hand on the hip region, one can, with very little force, sway the entire animal from side to side.

It may also be noted that the fore limbs are constantly moving to a slight degree backwards and forwards, owing to contraction and relaxation of the muscles concerned, whilst the feet are usually stationary. On the head being released it drops and the animal will frequently remain in the same position without any restraint for a considerable period of time. On turning, a larger space than usual is required, and the animal exhibits a marked degree of difficulty in getting round and frequently tramps one hind foot with its opponent. On trying to turn the animal in its own length, there is great danger of the animal losing its balance and falling. On being backed, particularly against rising ground, it is observed that a great deal of force is required; the hind feet are sluggishly dragged along the ground, widely separated, and often tramped on by the fore feet. On the animal being led into the stable it may knock its haunch against the door casing. When the stable is entered, if it happens to be a loose box the animal may stop in the middle of the house, even though the manger may be full of food, and remain in that position for some time with hanging head and partially-closed eyes. If visited a half-an-hour or so afterwards, it is generally observed that the animal has moved

towards some solid object and may be seen with his forehead pressed gently against it. If it has moved in the direction of the manger, it may be noted with its muzzle resting on the top of manger, or perhaps it may be seen slowly poking its muzzle through the fodder until practically the bottom of the manger is reached, where it now stands stationary, with the top of the muzzle near the bottom of the manger, provided the latter is not too deep. If the animal feeds, it will be seen that it only picks a few strands of fodder here and there, or, on the contrary, it may feed ravenously for a short time, then suddenly stop with several strands of fodder hanging from between its lips and then once more it relapses into a state of stupor with hanging head and partially-closed eyes.

These periods of dulness are alternated with bright periods, when the head is held in the normal position, the eyes open, position in stable normal, and with an apparent appreciation of its surroundings. These bright periods are generally very transient and seldom last longer than a few days. If the animal is confined in a stall with a head collar attached, it is observed with dependent head, often with the frontal region leaning closely against the partition or side wall. Commands are no longer obeyed, or only after a long delay, with prolonged shouting. Blows from a stick and whipping are not resented, or only slightly when increased in intensity. The ears are often hanging, not moved at noises, and shouting into them has little effect. In a great number of cases marked determined stamping of one or both hind feet is observed, and the stamping may be so intense as to cause the detachment of a shoe and mutilation of the stable floor, if the latter is not too firm. In a number of instances, the animals show a persistent habit of rubbing one of their hind feet against the opposite leg, and so violently is this done that one frequently notes bruising and laceration of medial aspects of the fetlock and metatarsal regions. The rubbing of one limb against the other is frequently accompanied by stamping of one or both hind feet.

In other cases, there is not only this rubbing of opposite limbs, but the animal also seems to have a persistent desire to rub its muzzle against any resistent object, even to the extent of lacerating the skin and causing a flow of blood. Cutaneous reflexes are now very sluggish or absent. The whole cervical and facial regions can often be pricked with a pin without a twitch. The corneal reflex is very sluggish or absent, the cornea can often be stroked with straw or finger without any movement of the eyelids. Frequently, on viewing the cornea from an oblique angle, small ulcerations can be detected. The pupil is generally dilated and does not react to light. The conjunctival mucous membrane is very congested and dirty, and there is generally a greyish-white-coloured discharge in the conjunctival sac. The pulse may now reach forty-five to fifty beats, but is normal in character. The respirations are generally increased to a slight degree, with marked expiration. The movements of flank muscles are often like those seen in "broken wind." In other instances, the respirations are very subdued in the beginning but gradually increase in intensity with the abdominal muscles as auxiliaries, when it is noted that the movements of the flanks are very obvious, with the costal arch well defined. Gradually these deep and prolonged respirations become slower and more gradual until breathing again becomes very slow and subdued. This type of breathing is somewhat similar to the Cheyne-Stokes type of respiration.

The temperature is still normal. The loss of condition has become more marked and, on superficial examination of the body of the animal, marks, wounds and abrasions, varying from a mere loss of hair to laceration of the skin, with considerable bruising of the subcutaneous tissues, will be noted over a number of the skeletal prominences. These will be noted in the region of the orbital process, zygomatic process, trochanter major of the femur, external angle of the ilium, the ischial tuberosity and frequently over the lower portion of the premaxillary and nasal bones. The upper eyelids are often swollen, due to the injuries received over the orbital processes.

The time taken to reach this advanced stage of the disease varies greatly in different subjects, when one considers that one animal may die four weeks after early symptoms have been observed, and another animal may live nine months before death occurs. During the course of the disease frequent remissions and exacerbations of symptoms are observed. Occasionally it happens that an animal, after showing definite symptoms extending from four to six weeks, will make a temporary recovery, and will even recover to such an extent as to be saleable. I have had such an animal under my observation, and on tracing his ultimate history I was informed that he died quite suddenly about six months afterwards, after having exhibited a violent attack of staggers.

As time passes and the disease progresses, it is noted, if the animal is housed in a loose box, that it keeps walking slowly around the box close to the walls, and appears to experience great difficulty in maintaining its balance. It will stop at intervals and will then rest, with its head pressed against the wall. Whilst in the loose box it pursues a straight line in its walk until it reaches a corner, where it stands with its head in the corner as if wanting to continue on its straight course through the wall, and then, after some delay in this position, it pursues the line of least resistance and turns with great awkwardness to move slowly along the adjoining wall. The head, lateral and posterior aspects of the hip regions receive fresh injuries every time the circuit of the loose box is performed. The animal's limbs may be seen in quite a variety of positions; when the animal is standing, all four limbs may be in a state of abduction, or the fore limbs may be closely adducted and well under the body, with the hind limbs widely abducted and placed behind the body; or the positions of the limbs may be reversed. Knuckling of one or both hind limbs may be noticed, and one fore limb may be crossed in front of its fellow. So many positions of the limbs are noted that it would be wearisome to describe them all. The animal occasionally lies down, but only for a few minutes, and then rises without considerable difficulty and without any assistance, only to continue on its endless parade again. The bedding, particularly that adjacent to the walls, is well tramped, and if straw is used, warping of it around the animal's limbs is noted. Food of any description is generally refused, and the animal may begin gnawing with its teeth at the woodwork of the manger, and in very rare cases makes biting movements with its mouth at anyone near it.

The animal presents a pitiful sight, with all its wounds and staggering gait. The tongue and mucous membrane of the lips are now cut, and present a number of ulcers and

partly-healed wounds. In some rare cases the fore feet are placed in the manger, and in other very unusual cases an attempt is made to climb the wall, by the animal placing its two fore feet on it. Loss of condition at this stage is very marked, and in long-protracted cases is even extreme in degree. Towards the end of the disease the pulse is quickened and may reach sixty to seventy beats per minute. The animal finally loses its balance, only to rise and fall again, or what more frequently happens is that it lies down and is unable to rise in spite of repeated feeble attempts to do so. It generally occurs that dissolution sets in within forty-eight hours after this inability to rise has shown itself. The animal's knees and fetlocks are now injured as a result of the struggling in its efforts to rise, but these efforts gradually subside and the animal remains quiet for several hours before death. In one instance, at this stage, the breathing was stertorous, respirations greatly increased, nostrils widely dilated, eyes prominent, pupils widely dilated, corneal reflexes absent, the fore limbs were moved convulsively at times and in the intervals of non-movement were in a state of tonic spasm. This animal died inside three hours from the time I observed the above symptoms. Sweating is never noted and the temperature practically always remains normal, but in two instances it was 103° F., and in each case the animal was lying unable to rise, and death occurred a few hours afterwards.

Symptoms Noted in Animals on Pasture.

When the disease is noticed in animals on pasture, the first symptom that attracts attention is that the animal is observed standing a longer time than usual in the same place, with head depressed as if grazing, but on drawing closer to the animal, it is seen that it is not eating, or it may occasionally nibble at some grass and then cease, after a few minutes, with a few grass blades hanging from the lips, and relapses into a sleepy state. It is sometimes observed standing quietly, as if sleeping, beside the hedge, and at other times it is observed to be always on the move, walking aimlessly through the field, stopping in occasional places and biting a few pieces of grass. In other cases the animal seems to prefer a path close to the hedge, and here one can always trace the numerous footmarks and beaten-down grass as a result of the constant treading of the animal. It may then start at a trot diagonally across the field, without any apparent provocation, and may end at the ditch side, where it may be seen eating rotten branches of trees, ends of burned whins, old withered leaves and even clay or gravel. I should like to state, at this juncture, that the earliest symptoms recorded in a mare with foal at foot on pasture were lying down and rising repeatedly—symptoms suggestive of the presence of abdominal affection, but after a few hours, when these symptoms abated, the animal's movements were watched, and in the course of a few days a definite diagnosis was made. Animals in which the disease establishes itself whilst they are on pasture, are generally brought into the stable and the symptoms displayed are similar to those noted in a stabled animal. If, as rarely is allowed to happen, the animal is permitted to remain outdoors, it frequently happens that the animal is discovered lying in a drain or ditch and, being frequently unable to rise, is destroyed.

Acute Form.—This form I have only encountered in about seven animals. It generally occurs in good-conditioned horses with glossy coats, and in animals on pasture, or where they have been a long time on pasture that season. It has practically always been noted in the months of July and August. It generally lasts at its longest about three weeks and is ushered in without any immediate previous history of unthriftiness. This type is characterised by the eyes being very prominent, pupils widely dilated and which do not react to light, total absence of corneal reflexes, generally anæsthesia of the skin, and great general dulness. A slight inequality in gait is observed, but is not very prominent. The animal blunders into objects when let go of its own free will, and may fall into a drain or wander straight up against a stone wall, where it will stand with head pressed against it until turned. In this type, the sensory nervous system appears to be more greatly affected than the motor nervous system. The absence of reflexes and loss of sensation is very marked, and inco-ordination of muscular action is not very manifest, whereas, in the chronic form, muscular inco-ordination is very pronounced and dominates the clinical picture. However, as time passes, the same train of symptoms as has been noted in the chronic form asserts itself, and, of course, some of them—such as frequent yawning—are present from the very beginning. Wounds on the skeletal prominences are not so numerous, owing to the comparatively short period which elapses before death. Towards the end of the disease the animal generally falls down, and death practically always follows within six to twelve hours.

A remarkable feature in this acute type is that animals are generally in good condition at the time of death.

It is of interest to note here that the acute form developed in a two-year-old filly which had shown definite symptoms of the chronic type four months previously whilst stabled during the month of March. On being put to pasture in May it made a remarkable recovery, and in the month of June it was in very good condition with glossy coat, when it suddenly developed the acute type of the disease about the middle of June and died inside seven days.

In the acute form there is never any relaxation of the symptoms and I have never observed any temporary improvement to occur.

The urine in both types of the disease is occasionally observed to possess a dark brown colour akin to that of ordinary tea. A few samples of urine submitted to the College laboratory in 1922 and 1923 showed the presence of glucose in one sample as high as 3·1 per cent., and albumin in one sample as high as 0·3 per cent. Glucose and albumin were not found in all samples of urine submitted. The necessary chemical, quantitative and fermentation tests were very kindly carried out by Professors Craig and Kehoe.

Course.

In the chronic form the disease may last for nine months and in the acute form rarely longer than three weeks. The disease is invariably fatal, although temporary improvements, extending up to a few months or more, are occasionally observed.

Diagnosis.

Chronic Form.—A definite diagnosis can be made even in the early stages of the disease by making careful observations of all the symptoms, and these can often be supplemented by trying to obtain, as far as is possible, the previous history of the animal and the symptoms noted by owner or attendant, particular attention being paid to

the behaviour of the animal whilst in the stable. The following symptoms are valuable guides: indifferent appetite, frequent yawning; periods of dulness, alternating with normal periods; slight inequality in gait; loss of condition and unthrifty appearance of the skin; abnormal positions adopted in stall or loose box, those pertaining to the head being first exhibited; dulling or absence of cutaneous reflexes, corneal reflexes and pupillary reflexes; depraved appetite; staggering gait; wounds over skeletal prominences, and determined stamping of one or both hind feet.

The above symptoms are given in a certain degree of order, as they become manifest in the average case. The facility with which one is able to diagnose the affliction greatly depends on the stage of the disease when one is requested to examine the animal.

Acute Form.—In this type most of the symptoms observed in the chronic form are noted, with, however, one noticeable exception, and that is that there is no history or presence of unthriftiness and that the animal is in good condition. The symptoms are ushered in much more quickly, and the previous history is frequently of negative value.

Differential Diagnosis.—The chronic form may be confused with dental trouble, sclerostomiasis, infestation with gastrophilus larvæ, and chronic gastritis.

The first and last conditions are more likely to be confused with the disease when it occurs in an animal of some years, and where it has been housed for a considerable time. Examination of the teeth and changing the animal to soft feed (even grass) followed by stomachics produces no good effect. The second and third conditions are more likely to be confused with the disease when it occurs in a young animal, or an animal which has been several months on pasture, and here one notes that vermifuge treatment and increased feeding have no beneficial effects and that the symptoms continue and develop in intensity.

The acute form may be confused with brain tumours and chronic internal hydrocephalus. It is here that one may make an error, since acute cases have a great number of symptoms in common with some of the above conditions. This type of case rarely lasts longer than three weeks, and symptoms continue and increase in gravity without any abatement to the end. Intermittent maniacal attacks are absent, and mania is never observed until the very end of disease and even then is very rarely observed. There is no remission of symptoms and the pulse is normal or quickened. The symptoms are general and systemic and never local. The examination of the optic disc by the ophthalmoscope might prove of assistance in eliminating some of these brain affections. The frequency with which the disease is encountered is of valuable assistance.

Macroscopic Lesions of the Disease.

The following lesions were found in the course of twenty-two *post-mortem* examinations. These examinations were practically all conducted on animals which died as a result of the disease, except in a few instances where the animals were *in extremis* and from humane considerations it was deemed advisable to have the animals destroyed.

Rigor mortis is always noted. Swellings and wounds are present over the orbital, zygomatic, femoral, great trochanters, external angles of ilia and ischial tuberosities. The knees, fetlocks, and medial aspects of the metatarsal regions may also present swellings and wounds. The lips are frequently cut and swollen. Swellings and wounds are frequently observed over the region of the nasal bones. The mucous membranes of the lips and tongue present ulcers and recent wounds. The eyes are usually closed and the upper eyelids are swollen and often present indications of trauma.

In the chronic form the skin is closely applied to the ribs and the coat is dry. The outlines of the ribs are very marked; the abdomen is very much reduced in volume and the flanks are hollowed. The animal presents a wasted or emaciated appearance. The under aspect of the abdominal wall and prepuce in geldings may be swollen, the swelling being usually not more than about one inch deep. This swelling pits on pressure.

On reflection of the skin over the abdominal wall, there is noted a marked scarcity of subcutaneous fat, which is very marked in cases of long duration. In some animals, one encounters in this position a layer of straw-coloured clear fluid about one inch in thickness. On reflecting the skin over the skeletal prominences enumerated above, one detects the presence of hæmorrhages and a collection of blood-tinged fluid and serum, the results of trauma.

In the acute form, the coat is glossy, the skin can be rolled over the ribs, the carcase appears well nourished and, on reflection of the skin, there is present a considerable quantity of adipose tissue. The other superficial lesions noted are the same as in the chronic form, except that they are not so numerous, much less extensive in nature, and some of them may be even absent. The lesions over the orbital and zygomatic processes are, however, always present. There is never any swelling of the abdominal wall noted in these cases.

The lesions encountered in the abdominal and thoracic cavities shall, for the sake of convenience, be divided as follows:—

(*a*) *Lesions constantly found in all subjects.*

(1). A quantity of straw-coloured clear fluid, varying in quantity from a few pints to a few quarts in the peritoneal cavity; a similarly-coloured fluid, varying from about eight to sixteen ounces, in the pleural cavities; and a similarly-coloured fluid, varying from three to five ounces, in the pericardial sac.

(2). Numerous white strands of fibrous tissue on the peritoneal aspect of the diaphragm in the hepatic region. In occasional places these are often attached to the border of the liver and in the majority of cases find adhesion to the diaphragmatic aspect of that organ.

(3). Cardiac hæmorrhages, consisting of petechiæ and ecchymoses, sub-epicardial and sub-endocardial in position. These are chiefly noted over the wall of the right ventricle. A few hæmorrhages are noted over both auricles, being sub-epicardial in position, but are more numerous over the right auricle. The sub-epicardial ones are much more numerous than those in the sub-endocardial position, the latter being chiefly observed on the auricular aspects of the bicuspid and tricuspid cardiac valves, and may occasionally reach the size of a threepenny piece. The remaining sub-endocardial hæmorrhages are ventricular in position. On section of the right and left ventricular walls, a few isolated hæmorrhages are noted throughout the substance of the cardiac muscle.

(4). In every case the liver presents signs of well-marked and distinct cirrhosis, easily recognised at a glance

The lesion of cirrhosis, although very distinct, varies in its intensity in different subjects, even in those in which the disease has been allowed to pursue its course with death as its ultimate result. On superficial examination the liver presents an uneven colour, being variegated in appearance, and frequently a slightly uneven surface. The variegated appearance is produced by the intermixing of a number of coloured areas which vary in prominence and depth of colour over the surface of the organ. There are reddish-brown areas of irregular shapes and sizes, resembling normal liver tissue, intermixed irregularly with those of a greyish white colour, and with others of a greyish brown colour. Disseminated throughout these areas there are a number of better defined though smaller, somewhat circular-shaped areas possessing a very dark or nearly black colour. The greyish-brown colour dominates the picture when viewed from a distance, but on a closer view over different areas the dominance of this colour is lost to a great extent in the greyish-white colour, and this is particularly noticeable in the region of the portal fissure. The edges of the liver are generally rounded and present a number of small fissures and notches. Portions of the edges are occasionally thinned away to such a degree as to seem to consist only of the approximated layers of the capsule. The capsule presents a number of whitish-grey-coloured areas on its diaphragmatic surface, which may carry a number of whitish-grey-coloured tufts or strands. These are generally short and thin. There are occasionally a number of whitish-grey-coloured depressed areas about the size of a threepenny piece, on the capsule, which may or may not give origin to fibrous tufts. The lymph vessels are prominent by their tortuous outlines on the visceral surface of the organ. The capsule does not strip clean, and the amount of liver tissue which adheres to it on stripping varies greatly in different organs. On palpation the organ is firm and shows considerable resistance when being pressed betweeen finger and thumb, and again this resistance to pressure varies somewhat in different livers.

On sectioning the organ with the knife, a grating noise is produced, and the colour effect observed on superficial examination is now very prominent after blood has been removed from the incised surface. The lighter-coloured areas are now more distinct and appear more numerous. On squeezing the incised surface of the organ, a little blood can be seen exuding from the small dark or black areas noted on superficial examination.

The livers in most of my cases varied in weight from eleven to seventeen pounds. Unfortunately, it was not possible to have the animals weighed and therefore I am unable to give the ratio of liver weight to body weight.

(*b*) *Inconstant Lesions.*

(1) Dilatation of Stomach.—In this lesion of the stomach, it is observed that the organ is engorged with food and appears to be at least three or four times the normal size. On manipulation before removal, it is very firm, due to gastric material, and on removal from the carcase care has to be exercised, otherwise it will be ruptured, due to the thin condition of its walls. The greater curvature is the region where dilatation is most marked, and the organ extends a good distance across the median plane of the body. On removal from the body it is not U-shaped but oval in contour. On emptying it of its contents immediately on removal from the body, the organ is still enlarged.

(2) Increased thickening of portions of the walls of the double colon and cæcum.—It is generally the first and second divisions of the double colon that are involved. This thickness of the bowel wall may reach three-quarters of an inch, and, on incision, is seen to consist of an accumulation of straw-coloured clear fluid, usually subserous in position, which is sometimes noted to involve the mucous membrane, the folds of which are then thickened. On incision the fluid oozes from the cut surfaces.

(3) Extensive infestation of the double colon and cæcum with round worms.

(4) Subserous atrophy of adipose tissue in the renal regions in the chronic form, as opposed to its abundance in these regions in the acute forms of the disease.

(*c*) *Lesions less frequently found.*

(1) Petechiæ in isolated areas of the small intestine, submucous and subserous in position.

(2) Ulceration of gastric mucous membrane. Ulcers the size of a half-crown are sometimes noted invading the glandular and œsophageal zones. Generally not more than one large one is detected, and its usual situation is in the glandular zone. Small ulcers with a diameter of not more than an eighth of an inch are more commonly noted, and are generally situated in the glandular zone in the region of the greater curvature. The glandular zone, in addition to the presence of ulcers, may present a dull-red-coloured area, suggestive of some form of gastritis. The food sometimes presents a black film over the ulcerated areas, probably due to decomposed blood resulting from the hæmorrhage from the ulcerations.

Treatment.

Curative treatment is most disappointing. A slight temporary improvement, lasting only a few days, is often observed after rapid purgation followed by a diet consisting of mashes composed of bran and oatmeal gruel, but the symptoms reassert themselves, even though the animal is still being fed on this laxative, non-bulky diet to the total exclusion of all fodder and oats. I have tried strychnine, potassium iodide, sodium sulphate, sodium chloride, calomel, pilocarpine, eserine, arecoline hydrobromide and ox gall without any success. Arsenic, iron and nux vomica, even in large doses, have no beneficial effect. Large doses of sodium bicarbonate, combined with a diet consisting principally of mashes, did seem to exercise a favourable influence on the course of the disease in one animal, but in another animal did not appear to have any effect in checking the symptoms. Unfortunately, the animal on which this treatment did seem to have a favourable effect was returned to its previous owner, and the treatment was discontinued, with the result that the animal was returned after the course of a few weeks and died as a result of the disease in a few days. However, as temporary improvements are occasionally observed in spite of any form of treatment, and since the alkaline treatment was negative in its effect on the second animal, I am inclined to believe that the improvement in condition of the first animal was a natural one and not attributable to the sodium bicarbonate.

Botanical Surveys.

I carried out botanical surveys on fifteen farms, my reason for doing so being that the condition met with in

Ireland is closely allied, if not similar, to a condition noted in South Africa, New Zealand, United States and Germany, and in which countries it is alleged that the probable cause is a plant poison.

Summarizing my botanical findings in connection with the examination of pastures over which a number of the animals affected with cirrhosis of the liver had grazed, the most I can say is that the pastures were of a poor grazing quality and always carried a large percentage of weeds. There was no outstanding plant observed on these farms, and which I have not observed in a great number of other non-affected farms. The suspected and ubiquitous ragwort was always present, in some pastures in great abundance, and was often noted in conjunction with the *Lotus major*. These two plants always attracted attention owing to their abundance and conspicuousness. The amount of these plants carried by different inspected pastures was subject to great variations. The other chief ordinary weeds noted were the thistle, *Lotus coniculatus* (bird's foot trefoil) sorrel, common buttercup, chickweed, ordinary daisy, or eyedaisy, wild forget-me-not and marsh violet. These plants were observed on second, third and fourth year lea grazing pastures.

I have had only a few opportunities to obtain samples of hay for examination for the presence of weeds, as frequently on asking for a sample of hay on which the animal had been fed during the previous year or months, I was informed that it was exhausted and the animal was now receiving different hay or straw. I have only in a few instances in a few samples detected the presence of the ragwort plant. The sorrel, thistle, meadow vetchling, wild vetch and wood pea were rather commonly found. The examination of the hay samples was not satisfactory, as I had obtained too few samples, and often not from the desired or suspected crop. Furthermore, in the obtaining of these samples one would require to obtain and examine a number of fair samples from the same source, as there may be pockets of a certain plant in the peak or cock.

On reviewing the different plants observed on surveyed pastures from a toxicological standpoint, eliminating those not proved to be injurious to live stock, and considering those reputed and others definitely proved to have toxic qualities, one is naturally attracted to the ubiquitous ragwort, in view of its abundance on pastures; in view of its toxic qualities definitely proved by experiments on horses; in view of the lesions it produces in experimental animals; in view of the latent or incubation period which generally follows its administration before symptoms are shown, and in view of the close similarity between the disease as noted here and Winton disease in New Zealand, which latter disease is stated by Gilruth to be associated with the ingestion of *Senecio jacobæa*.

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Histology of Liver in the Cases of Liver Cirrhosis in Horses.

By J. F. C.

We have examined a large number of sections from affected livers and found the appearances practically identical in all cases. The cirrhosis was largely monolobular. The new fibrous tissue had a very irregular distribution, but followed to a large extent the portal vein and its branches and the hepatic vein and its veins of origin, including the intra-lobular vein. Around the former, in particular, it appeared in thick coarse strands which only at places tended to form a network enclosing in its meshes one or two lobules, while in others it appeared in the form of islands or nodes. In the coarse strands accompanying the portal vein, small bile ducts appeared to be abnormally numerous as if some had been newly formed, and included in these strands were isolated hepatic cells or groups of cells apparently pinched off from their lobules. From these strands fine fibrous filaments often extended into the lobules, forming a fine network in the meshes of which individual cells or group of cells were enclosed. This change varied in different sections. Where the lobules were broken up in this way the hepatic cells were undergoing atrophy and were charged with pigment. The cells varied considerably in size, and some of them contained fat droplets. At some points the central vein and neighbouring sinusoids became dilated and formed large spaces filled with blood, almost like the cavernous angiomata of the ox's liver. This may have resulted from venous congestion caused by constriction of a hepatic vein by the fibrous tissue around it. Kupffer's cells in some places also contained brown pigment which was shown to be iron-free.

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Artificial Sunlight for Lions.

At the London Zoological Gardens, artificial sunlight treatment is being given to three lion cubs for the prevention of rickets. They appreciate the treatment so much that they climb of their own accord into a basket placed immediately under the lamp.

The Veterinary Record.

22nd February, 1930.

Ragwort Poisoning and Cirrhosis of the Liver.

We are glad to be able to reproduce in this issue the contribution to the subject of ragwort poisoning and liver cirrhosis, recently presented by Professors Craig and Kearney and Mr. J. F. Timoney to the Veterinary Medical Association of Ireland. The occurrence of widespread outbreaks of "staggers," dating as far back as 1787, and appearing more particularly in hot and dry summers, was recorded by Williams, who noted also that many farmers had suspected these outbreaks to be associated with the consumption of ragwort. The actual proof of the rôle of ragwort in this connection was lacking, however, until the experimental studies undertaken overseas, and especially in New Zealand by Gilruth and in South Africa by Theiler and Robertson in the early years of this century. Since that work was carried out, we have had careful studies of the similar condition occurring in this country, from the late Sir Stewart Stockman, Professors Craig and Kehoe, and Mr. W. J. Leyshon.

This further contribution to the subject is welcomed, but in connection with the series of cases now recorded, we note that they have occurred over a limited area, and that a very considerable number have been detected by one practitioner who has for years been interested in the condition. It is readily understood that such a condition will show a very irregular distribution, as the occurrence of cases does not depend merely on the distribution of the Senecio, but is very definitely dependent also on the general nature of the pasture, and the amount of more palatable food accessible to the animals. It seems most probable, however, that at least some cases occurring elsewhere are not detected, and still more that others, although detected, are not recorded. The losses from this condition in years favourable to its occurrence are probably much greater than has been realised, and it is hoped that other practitioners who may encounter similar cases will record them.

Another point of interest is that Senecio poisoning belongs to the group of chronic intoxications characterised by very slow development, and the occurrence of a latent period comparable to the incubation period of a microbic disease. From their very nature such conditions may be most difficult to detect, and for a long time there may be no suspicion of any connection between the ingestion of a plant and the long-delayed effects, which may appear suddenly at a time when the plant is no longer being consumed. There is every possibility that many of the obscure cases of disease which from time to time are encountered by every veterinarian may have some such explanation.

Finally, the work presented by Messrs. Craig, Kearney and Timoney is a happy example of the progress which may be expected to accrue from the cordial co-operation of laboratory and field workers. The practitioner encounters a wealth of interesting material, for the study of which he has not always the time and facilities, and the laboratory worker with his special equipment, can be brought into touch with much of this material only through the help of the practitioner. It is true that our laboratory workers are still few in number, and therefore not always able to give the necessary time and attention to problems that are brought to their notice, but no circumstance could give a greater stimulus to the progress of our profession than the further development of such co-operation as is shown by the contribution to our knowledge which forms the subject of these remarks.

Army Veterinary Service.

London Gazette—War Office—Territorial Army.

February 11th.—Major W. G. Burndred resigns his commission and retains his rank, with permission to wear the prescribed uniform (January 17th).

Regular Army.

February 14th.—*Cavalry (R.H.G.)*: Vet. Maj. G. B. C. Rees-Mogg, O.B.E., to be Vet. Lt.-Col. (Feb. 13, 1930).

Humane Slaughter of Animals.

Miss Susan Lawrence, in a written reply to a question addressed to the Minister of Health by Lieutenant-Colonel Moore, states that the total number of local authorities in England and Wales who had adopted the Ministry's model bye-law 9b, in regard to the humane slaughter of animals, up to January 31st, was 349.

Sir Robert Gower asked the Minister whether he would consider the desirability of issuing a circular to local authorities urging them to frame bye-laws making the use of the humane killer for the slaughter of animals in their respective districts compulsory. Miss Susan Lawrence replied that the Minister did not consider the present time opportune for a circular.

Clinical and Case Reports.

Multiple Chondromata of the Femur and Pelvis of a Cat.

By T. F. Prime, M.R.C.V.S., Upper Norwood.

About three months ago, a ten-year-old male castrated cat was brought to me for examination as he was going lame on the right hind leg. On examination I found what felt to be a large callus on the upper third of the femur, which had not been felt or suspected by the owners. Now, on visiting the cat, I find that practically the whole of the right femur, the pelvis, the pubis and even the left femur —upper portion of the shaft—are affected. The tumour, which is becoming very large, seems to consist of a number of cysts. The right hind leg is useless, but there seems to be no pain, tenderness nor tendency to slough, the skin looking perfectly healthy.

These tumours, especially of such a size, are rarely seen in a cat. The animal is eating fairly well, but is fast losing condition.

Off the Beaten Track.

By T. F. Prime, M.R.C.V.S., Upper Norwood.

Never knowing whether the next message will be to see a lion, canary, tortoise, or some goldfish which are ill, one has more or less to group the creatures which may be said to lie beyond the range of customary patients. By that I mean, treat and expect practically the same diseases, temperaments, and peculiarities as to drugs and dosage as one would expect in the nearest type of domesticated animal—for instance, lions, tigers, etc., as big cats; wolves, foxes, jackals and hyænas as dogs; camels, hippopotamus, etc., as cattle; llamas, goats, etc., as sheep.

Lions and tigers, like cats, are very liable to lung troubles, which respond for a while to treatment and then recur. Distemper in them, as is distemper in cats, is always a serious and troublesome disease. Reptiles, such as tortoises and alligators, often become injured, the latter especially, through fighting. The wounds seem to heal very slowly and one is too much inclined to try and hurry them up with strong dressings. Alligators are comparatively easy to handle as the mouth can be secured like that of a dog, but one must take care to have the tail held or well restrained, or one may get knocked off one's feet. Deer are amongst the most dangerous animals to manage and one must beware of a kick from their sharp, knife-like hoofs; they should be lassoed and hobbled before doing anything to them.

As to the medical treatment of the monkeys, it is an open question whether a medical man cannot diagnose and treat their diseases better than a veterinary surgeon, as they should be dealt with as human beings, to be in the least successful.

One should never try and fight really sick wild animals, as if one does succeed in mastering them, they seem to sulk and die. Even administering chloroform for an operation in some of the more timid varieties of wild animals seems to have a peculiar deadening effect and they often pine, succumbing a little while afterwards.

Cervical Fracture in a Hunter.

By R. A. Gooderidge, Major R.A.V.C.

A horse, whilst being hunted with the Bicester hounds on January 11th last, was presented at a fence with a considerable drop on the landing side.

The horse fell on landing, with his head twisted under his neck, but got up and the rider mounted and rode on for about quarter of a mile, when the horse began to feel weak under him and to slow up.

The rider dismounted and led the horse to the nearest village, where there were some motor horse boxes (about 1½ miles). On arrval at the village the horse would not go into a box and refused to move. After about half-an-hour he went down and died in a few seconds.

Post-mortem revealed fracture of the body of the fifth cervical vertebra. The time which elapsed from the fall at the fence to death was about two hours.

From The Veterinarian,

January, 1830.

Inflammation and Rupture of the Liver.

By Mr. Palmer, Crown Street, Soho.

November 30th.—An aged brown coach-horse was brought to my forge about 12 in the day; the owner accompanied him, and wished him to lose a little blood, as he was informed by his coachman that he had not eaten his corn the night before, nor this morning; he had, however, done his work as usual. I examined him, and found, with the exception of a slight increase in breathing, nothing about him to indicate anything wrong; but knowing him previously, and seeing that he had made flesh rather fast latterly, and observing, as before mentioned, the breathing somewhat hurried, I readily assented to bleed him, after which, by the desire of the owner, he took a common diuretic; he afterwards stood some minutes in the forge, when the breathing appeared much increased; and he then, for the first time, began to show some little uneasiness, in rather a peculiar manner, by shifting first one hind leg, and then the other, which he would do 10 or 12 times in a minute; he then did the same with the fore ones. Before he left the forge he began to evince more pain, by pawing a little with one fore-foot. I now requested that he might be taken gently home, and said I would see him early in the afternoon.

Being a good deal engaged in the afternoon, I was not able to see him so soon as appointed, but about five o'clock the owner called on me, and said he thought him better, although soon after he got home in the morning he had been much worse, and showed a great deal of uneasiness, by frequently lying down, and stretching his head out under the manger. The coachman, supposing it might be spasm of the bowels, raked him, and soon afterwards he staled; and then, up to the time the owner called on me, he was thought to be doing well. I saw him for the second time about six o'clock in the evening, and found him lying down, and whilst lying, apparently in no pain; but on my entering the stable he immediately got up, and walked rather quickly towards the manger, as though he was going to feed; but he had no sooner got there, than he backed very quickly to the hind part of the stable, where he in part supported himself against the wall for about a minute. I now proceeded to examine him very closely, and found his pulse about 70; ears and extremities rather cold, Schneiderian membrane and conjunctiva very pale. On putting my finger into his mouth,

it was coated with a white slimy mucus, and I know nothing better to compare it to than a mixture of prepared chalk made very thick. Upon further inspection, I found the tongue coated with the same; respiration a very little hurried; but there was the shifting of the feet, one after the other, as noticed in the early part of the day. I was now quite satisfied that a great deal more was the matter than was anticipated by his owner, or than I had suspected in the morning, but did not feel assured as to the real disease, although strongly suspecting diseased liver. I did not feel inclined to do much; seeing, however, that his bowels were somewhat constipated, I attempted to give him a dose of oil, but I found this quite impracticable from the very great resistance which he made; and the owner informed me that his people could never give him either draught or ball. I now attempted, and succeeded in giving, a mild aperient; threw up several large glysters and ordered him into a loose airy box, and to be clothed warm. On leaving the stable, I requested my assistant to meet me there in two hours, determined, should we find him no better, that he should lose more blood. I had not been gone above three-quarters of an hour before the owner came, in great haste, and said he was down, and he thought dying. He then asked me what I thought was his disease, when I told him I had strong reason to suspect he had inflammation of the liver.

Upon arriving at the stable, I found him standing; pulse between 90 and 100; breathing at times much more accelerated, conjunctiva and Schneiderian membrane very pale, and the same appearance of the mouth as before described. I now gave a decided opinion as to its being a disease of the liver; and suspecting that internal hæmorrhage had taken place, and knowing he must die, I proposed bleeding him again, which was accordingly acceded to, but we had not got above a quart, when he staggered and fell, and died in 20 minutes.

Post-mortem Appearances.

Upon opening the abdomen, I was quite prepared to meet a large hæmorrhage; but notwithstanding our precaution in exposing the intestines, we lost a considerable quantity of blood, in which they were completely swimming. After they were taken out, I measured six gallons from the abdominal cavity, before we were able to get a sight of the liver, which we found to be torn five or six inches across its greater lobe, the whole substance of which put on the appearance of coagulated blood; its structure was so broken down, it could only be taken out by pieces. All the other viscera of the abdomen and thorax were quite healthy, and the former very thickly lined with adipose matter. The only way in which I am able to account for this disease is, that in the late snow and frost, he, not being rough-shod, tumbled about very much, and fell down several times; after this he took to lying down while out in the street at night, which he had never done before. As, however, he fed well, and did his work as usual, this was not taken much notice of. On further enquiry I found that he had been, as might be expected, very costive; and it had been found necessary to give him several bran mashes for more than a week past.

P.S.—I should have mentioned that, in bleeding in the morning, the blood did not come away in one free stream, but by repeated jerks or jets.

Tuberculous Milk.

At a recent meeting of the Health Committee of the Cardiff City Council, Dr. Picken reported several cases of tuberculous milk that had been detected in the city since the previous meeting. One was a sample of Grade A milk from a supply to a public institution. The source of this milk was traced and the cows of the herd were examined without any tuberculosis being found amongst them. It was, however, ascertained that some cows had been sold by the farmer just previous to the visit of the inspector.

Capt. James Griffiths asked whether the purchasers of the tuberculous cows could be traced.

Dr. Picken: The less said about what we can trace as to the ultimate use of these animals the better.

Divisional Report.

Veterinary Medical Association of Ireland.*

Quarterly Meeting at Dublin.

The quarterly meeting of the Veterinary Medical Association of Ireland was held in Dublin on Friday, November 29th, 1929. There were present Mr. Dodd (President) in the chair, also Messrs. G. Bell, J. M. Murphy, G. Hobson, P. J. Gaffney, L. M. Magee, J. S. McCann, E. V. Kelly, P. F. Dolan, M. J. McClancy, J. Doyle, S. Conway, D. C. Greene, E. W. Little, J. F. Timoney, J. E. Kenny, P. J. Howard, S. O'Donovan, J. M. Morris, H. Dolan, and Professors Browne, Craig, Kearney and O'Connor (Hon. Secretary).

The minutes of the previous two meetings having been circulated, were taken as read, and were confirmed and signed.

Exhibit.—Mr. Magee asked permission to show an interesting specimen before the regular business began. He remarked that members need never be afraid of showing ignorance at these meetings; he often did, and looked for information, which he invariably got. This case was one of a calf four months old which had fits, and his advice was asked. He suggested breadsoda in milk, but this had no effect. He saw that the animal appeared in perfect health but the owner said it suffered from very bad fits. Mr. Magee thought it might be brain trouble, or possibly derangement of one of the stomachs. The calf got worse in a few days, and he advised castor oil, but that did no good. The animal died in a few days, and the carcase was brought in to Professor Craig for *post-mortem*, when he discovered the binding cord (exhibited) in the rumen. How did it cause the fits or death? Was the juvenile animal more susceptible than the full-grown? He would ask Professor Craig if he could explain why that should cause violent symptoms in this animal, while foreign bodies would not cause much trouble in the large animal.

Professor Craig said that this was not an uncommon cause of death in calves, the usual reason being that the binding cord was picked up by calves in pens, where it was hidden in straw sheaves from which the cord was cut and left, instead of being removed; they picked up the cord when cleaning their bed. The fits might be attributed to reflex action by the attempt of the muscular walls of the rumen to force on the foreign body. This was not uncommon and led him to suggest it to Mr. Magee as the possible cause.

Papers.—Professor Craig then read a paper, prepared by Professor W. Kearney and himself, on "Ragwort Poisoning in Cattle," and was followed by Mr. J. F. Timoney, who read a paper on "Cirrhosis of the Liver in Horses." [These papers are reproduced at the commencement of this issue of the *Record*.—Ed.]

Both of these essayists exhibited specimens of liver

* Received for publication on January 23rd, 1930.

cirrhosis in cattle and horses. Following the papers, a letter from Mr. McCorry, of Ballyconnell, *re* cirrhosis of the liver in horses, was read as follows:—

"I much regret that I cannot attend your meeting on the 29th. I wished to learn something about the subject of "Cirrhosis of the Liver in Horses." I am sure the authors will deal with the matter in an interesting and instructive manner.

"Having had a good deal of clinical experience with this disease, scarcely a season passing in which I do not get a few cases, I take the opportunity of tendering a few remarks in writing.

"I am not acquainted with any literature on this condition, but I am firmly convinced that the disease is closely associated with bad stable management. I find it is the small farmers' horse which is usually the victim. What is the state of affairs here? One finds that a great deal of the animal's life is spent in idleness; and milling large quantities of hay. He is used occasionally to run to church, fair, or market, and in the spring of the year, an attempt is made to steam him up with oats, to join with his neighbour in putting in a little crop. The only happy time the animal ever has, is when turned out to grass, and it is strange that during this little period of luxury the disease frequently asserts itself—most of the cases come under my notice in summer and autumn.

"I am not quite sure of the views of the authors and a great number of practitioners, on the cause. One thing must be remembered, that the digestive system of the horse is not a mill for the breaking up, digestion, and assimilation of loads of hay, and it would be accurate to add of *inferior quality* and sometimes badly sowed.

"Given this as a basis, I am sure the combined efforts of the physiologist and pathologist will answer with a certain amount of accuracy most questions put to them on this disease in equines, in relation to cause and effect.

"In support of what I have already said, I must here mention that I have yet to meet a case in Great Britain or Ireland, in a hunter or thoroughbred, whose rations are good, balanced, and where exercise and work is the rule.

"I do not know whether any feeding experiments have been carried out with a view to producing this disease with all its symptoms. I feel this might prove disappointing at the experimental station, in view of the length of time it might take to get results, and knowing that it is often hard to produce diseases, experimentally, which one incidentally meets with in practice. Then there is susceptibility. I do not know whether susceptibility is very important, but I have heard horse owners say, when told of the complaint, 'Oh, I remember, some of the breed of this one died in the same way.' I have certainly some evidence to support this.

"Age appears to be no barrier, cases occurring from five years of age and upwards, but the majority occur in middle age—10 to 15 years.

"Diagnosis is usually not difficult, but to the junior, unacquainted with the disease, it may be baffling.'

"As to treatment, I have little to say. As we are all anxious to avoid quackery, one feels like taking fees under false pretences by persisting in treatment. According to present knowledge, once definite signs of cirrhosis appear, death is to be expected. It is true that appropriate treatment does dispel the outstanding symptoms for a period of sometimes from two to three months, but the animal relapses into the former state."

The Chairman remarked on the exceedingly interesting papers to which they had listened and invited the members to open the discussion on them.

Mr. Howard said their thanks were due to Professor Craig, Professor Kearney and Mr. Timoney for the best papers that had ever been brought before the Association, and that it was a disgrace that the meeting was not more largely attended. It would be impossible to do justice to the papers by trying to discuss them that evening and he would propose that the papers be printed and the discussion postponed to a future meeting, as the hour was now so late. The Chairman seconded this.

Mr. McCann suggested that the discussion be held at the Annual General meeting, if that would be in order. Mr. Howard said there were no rules against that procedure.

Mr. Magee thought that the papers should certainly be discussed at the next meeting. It was a most interesting and important subject, but, so far as he knew, few members of the profession had met with that disease in the horse.

It was finally decided that the discussion should be postponed to a future meeting.

Benevolence.—Mr. Howard then appealed to every member of the profession, both present and absent, to send a subscription to the Veterinary Benevolent Fund. Half-a-guinea was a very small membership fee. Tremendous good was done by the fund in Ireland and the least the Irish members might do was to send a small subscription, for they sorely needed subscriptions now. He would be delighted to forward any subscriptions given to him.

Professor Craig supported the appeal and mentioned that a very small amount was contributed by that country, while large support was sent to needy people in it from the Fund.

Professor O'Connor also supported the appeal.

The *Report of Council* was read, approved and adopted.

Eradication of Bovine Tuberculosis.—A letter from the Editorial Representative of the N.V.M.A. was read with reference to the publication of divisional reports of discussions on the West of Scotland scheme for the eradication of tuberculosis.

The Hon. Secretary stated that they had not received a copy of the scheme.

Professor Craig said that the scheme was not likely to have universal support; it was too ambitious. The standardisation of tuberculin and its control by the Minister of Agriculture as to standard sale, so that none but veterinary surgeons could use it, was a splendid ideal, but methods of eradication of the disease in places such as America would not suit here. The Agriculturalists had been forgotten, but any scheme must have their support, and in order to get this they must be educated up to it. What would be more likely to succeed would be to extend the Tuberculosis Order and the grading Order in regard to milk. Until members were familiar with details of the scheme, however, there was no use in their discussing it.

Mr. O'Donovan remarked that the Tuberculosis Order made no headway in England. Not one per cent. of the milk was graded. The veterinary profession should point the way to the eradication of tuberculosis. A start should be made by wholesale eradication in small areas, which could be afterwards extended.

J. J. O'Connor, *Hon. Secretary.*

Shire Horse Show.

At the last meeting of the Council of the Shire Horse Society it was reported that, for the fifty-first show, to be held at the Royal Agricultural Hall, on February 25th-27th, a representative entry had been secured, comprising 117 stallions, 91 mares and fillies, 44 geldings, and 79 produce, so that a comprehensive exhibition of Shires of all ages and both sexes was assured.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Feb. 22nd.—Meeting of the North Midland Division, N.V.M.A., at Sheffield.

Feb. 24th.—Meeting of the Editorial Committee, N.V.M.A., 4.30 p.m., at 10 Grays Inn Square, W.C.1.

Feb. 27th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Carlisle.

Feb. 28th.—Annual Meeting of the Eastern Counties Division, N.V.M.A., at Norwich.

Mar. 7th.—Annual Dinner of the Lancashire Division, N.V.M.A., at Liverpool.

The Royal Army Veterinary Corps Point-to-Point Challenge Cup.

Conditions of Race.

For horses the property of or Government Chargers and Troop Horses hired by Officers, R.A.V.C., which have been regularly and fairly hunted with a recognised pack of hounds or military drag hounds. No horse is eligible to run that has ever won a race of any description (Point-to-Point, *bona fide* Hunt and Military races excepted).

Winner to receive the Challenge Cup and replica and 75 per cent. of the sweepstake, second to receive 25 per cent. of the sweepstake.

Catch weights 12 stone 7 lbs. The winner of a Point-to-Point, *bona fide* hunt or military race to carry 7 lbs. extra; of two or more such races, 10 lbs. extra.

Entrance fee, one sovereign.

To be ridden by those qualified to enter.

. . . . . .

The above race will be run in connection with the Hambledon Hunt Point-to-Point Steeplechases on Saturday, April 19th, at Liss, which is situated three miles from Petersfield and five miles from Bordon. The course is not less than three miles over a fair hunting country.

Arrangements will be made to provide stabling, forage and accommodation for grooms at Aldershot or Bordon, on application to the Hon. Secretary at the time of entry.

A Corps Tea Tent will be available on the course for the use of Officers and their friends. Tickets, price 2s. each, can be obtained from the Hon. Secretary or by R.A.V.C. Officers on the course.

The race is open to serving and retired Officers, R.A.V.C.; Officers of the R.A.V.C. Territorial Force (serving or retired), and retired temporary Officers of the Corps may be permitted to enter as Honorary Members, subject to acceptance by the Committee.

Financial assistance will be given to Officers entering, whose horses are normally stabled outside a radius of 30 miles from the venue of the race; such assistance not to exceed £4.

Entries close at noon, April 14th, and should be sent, together with the entry fee, to the Hon. Secretary, R.A.V.C., Point-to-Point Association, Station Veterinary Hospital, Aldershot.

It is hoped that all Officers who are able to do so will enter and so ensure the success of this sporting fixture.

Personal.

Birth.—McCleery.—January 28th, 1930, at Woodsley Nursing Home, Leeds, to Freda, wife of E. F. McCleery, M.R.C.V.S., a daughter.

Macqueen Testimonial Fund Subscription Lists.

We are requested to point out that, in the third list of subscribers to this Fund, which was published by us last week, with the name of Mr. A. Cornish-Bowden should have appeared that of Mr. S. F. G. Hodgman, while in the second list "F. L. Gooch, Esq.," should have read "F. L. Gooch and Son."

Testing of Cattle for Australia.

The High Commissioner for Australia (Sir Granvill Ryrie) has received official advice from Australia to the effect that, under a new amendment to the Quarantine Regulations, cattle intended for export to Australia from Great Britain and Ireland must in future be tested by a double intradermal tuberculin test.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Somerset County Veterinary Officer Appointment.*

To the Editor of The Veterinary Record.

Sir,—We are sure that the resolution of the Mid-West and South Wales Division with reference to the appointment of a Veterinary Inspector for Somerset must be a surprise to many members.

The discussion at the Council meeting, as reported in last week's *Record*, leads us to believe that someone did not withdraw his application and was appointed. We were informed, when the "ban" was placed on the appointment, that the local Division had asked the "National" to take action and promised full support. This, no doubt, influenced certain applicants to withdraw, as it was expected that the local practitioners would know and understand local conditions and duties. The members of this Division, however, apparently do not appreciate the support given to them, and the Council of the N.V.M.A., and from the resolution it would appear that those who withdrew were carried away by an excess of *esprit de corps*, which, according to this resolution and the reported discussion, was not expected.

The Council allowed the motion to lie on the table, but this indefinite action will not make members very enthusiastic in their future support. Would it not have been advisable if, instead of having the actions of this Division "explained," the resolution had been criticised and a suggestion made that, if Somerset County Council were again approached and agreed to the scale, the post should be re-advertised? We are afraid that, unless there is a satisfactory explanation given, many members will in future ignore any ban and later hope for a kindly-disposed local Division, as this would now appear the better course. It would be interesting to know if the person appointed to Somerset County Council is a member of the "National."

Yours faithfully, F. A. Davidson,
Geo. A. Sangster.

County Buildings,
Dumfries.
February 7th, 1930.

[* Owing to pressure on our space, this letter, received for insertion in last week's issue, unavoidably was held over.—Ed.]

Veterinary Collegiate Training.*

To the Editor of The Veterinary Record.

Sir,—The President-Elect of the Mid-West Association, in his address, urged the more practical training of the student while at college. He might have extended his criticism still further. It always has appeared to me a great waste of valuable time to concentrate on such *elementals* as botany and chemistry to the detailed extent that is done to-day, especially when one considers that these subjects enter now largely into public schools' curricula. If these were to be curtailed, more time and thought would be given to the *essentials, i.e.,* anatomy, physiology, bacteriology, pathology, medicine and surgery.

But what our calling wants to-day, more than anything else, if it is going to take its rightful place among the learned professions, is "*Savoir faire, savoir rire.*

I am, Sir,
Faithfully yours,
W. Scott.

Friarn House, Bridgwater.

Melanotic Tumours Wanted.*

To the Editor of The Veterinary Record.

Sir,—I have recently had a letter from the Rowett Institute, Aberdeen, asking for assistance in obtaining Melanotic Tumours for analysis.

The Institute would be greatly obliged if members of the profession would kindly forward any they might come across to Mr. Cunningham at the Rowett Research Institute, Bucksburn, Aberdeen.

Yours faithfully,
R. G. Linton.

Royal (Dick) Veterinary College, Edinburgh.
February, 7th, 1930.

A Puzzling Case in a Hunter.*

To the Editor of the Veterinary Record.

Sir,—I was much interested in Mr. J. C. Gaunt's "Puzzling Case" in this week's *Record.*

I have no personal experience of anything exactly similar, but if Mr. Gaunt or anyone interested cares to turn up Vol. XXVI of the *Record,* September 27th, 1913, he will find an article on "Ephemeral Lameness" by the late E. Wallis-Hoare, which appears to have considerable bearing on the case, though it does not add much to knowledge; this article is also rather amusing from a practical point of view.

Yours faithfully,
J. R. Baxter.

Downington House,
Lechlade, Glos.
February 11th, 1930.

International Rugby.*

To the Editor of the Veterinary Record.

Sir,—Could you provide the necessary information, to settle an argument, *re* the recent England *v.* Wales International Rugby match at Cardiff?

Was a veterinary student included on either side?

Yours faithfully,
D. Hogg,
Major, R.A.V.C.

[T. E. Jones-Davies, who represented the Principality at centre-threequarter, and who captains the London Welsh fifteen, attended the Royal Veterinary College during the Autumn Term, 1929, but was not a veterinary student at the time the Cardiff International was played. Our only "capped" student therefore, is W. C. Agnew, who assisted the Scots to defeat Wales at Murrayfield on February 1st, and who has been selected to represent his country against Ireland at Murrayfield on Saturday next.—Ed.]

Macqueen Testimonial Fund.

To the Editor of The Veterinary Record.

Sir,—Most of your readers will have observed the Notice which appeared in your issue of February 15th announcing that the above Fund will be closed on March 31st.

I shall be extremely grateful if you will permit the publication of this reminder, for by its prominence in your correspondence columns it may reach the eyes of many who have not yet sent in their donations and who intend doing so, but who may not have observed the previous notice.

It is very gratifying to observe that donations continue to arrive and it is to be hoped that by March 31st the total amount subscribed will have reached dimensions in keeping with the object for which the Fund was inaugurated. The date, place and manner of the presentation will be announced in these columns at a later date after consultation with Professor James Macqueen.

I am,
Yours faithfully,
George W. Dunkin,
Hon. Sec., Macqueen Testimonial Fund.

National Institute for Medical Research,
Farm Laboratories,
Mill Hill, N.W.7.
February 15th, 1930.

West of Scotland Division's Scheme for the Eradication of Bovine Tuberculosis.

To the Editor of The Veterinary Record.

Sir,—It appears to me, on reading in your columns the reports of divisional meetings, that many of our colleagues, in England particularly, rather under-estimate the strength of conviction and purpose which lies behind this scheme. Much thought and care went to its devising, and while the promoters of it have always expected that it would receive considerable amendment, they have never "expected that the scheme would be pulled to pieces" in any reasoned examination, nor do they agree that it has yet been pulled to pieces.

In Scotland it has been subjected to detailed scrutiny by every division, and it has now been adopted as the official policy of the Scottish Branch. A committee appointed by the Branch, and composed of teachers, public health officials and practitioners, is at present engaged in re-drafting the terms of the scheme, *without making any alteration in principle.* A work thus sponsored cannot be casually thrown over with such a phrase as appeared in one of your reports, "he agreed it was no good as it stood."

I do not intend at the moment to canvass the merits of the Scottish proposals; they are likely to be amply discussed before long. My purpose is to emphasise that these proposals are put forward not merely as a kite to test the wind and to be pulled down immediately in tatters, but as a very serious effort to grapple with a great problem. There is in the profession in Scotland a large volume of support for this plan, profoundly convinced not only that it is the most practical and comprehensive yet put before the country, but that its presentation makes one of the important occasions in veterinary history.

I am, Yours, faithfully,
Donald Campbell.

70 Greystone Avenue,
Rutherglen.
February 10th, 1930.

The Editor acknowledges the receipt of the following:—

Communications from T. Le Q. Blampied (Jersey), Mr. W. P. Blount (Edinburgh), Dr. O. Charnock Bradley (Edinburgh) and Mr. A. Spicer (Oxted).

Report of a meeting of the Yorkshire Division, N.V.M.A., from Mr. S. Sharp, Hon. Secretary.

[* Owing to pressure on our space, these letters, received for insertion in last week's issue, unavoidably were held over.—Ed.]